SOUTHERN RAILWAYS *Magazine*

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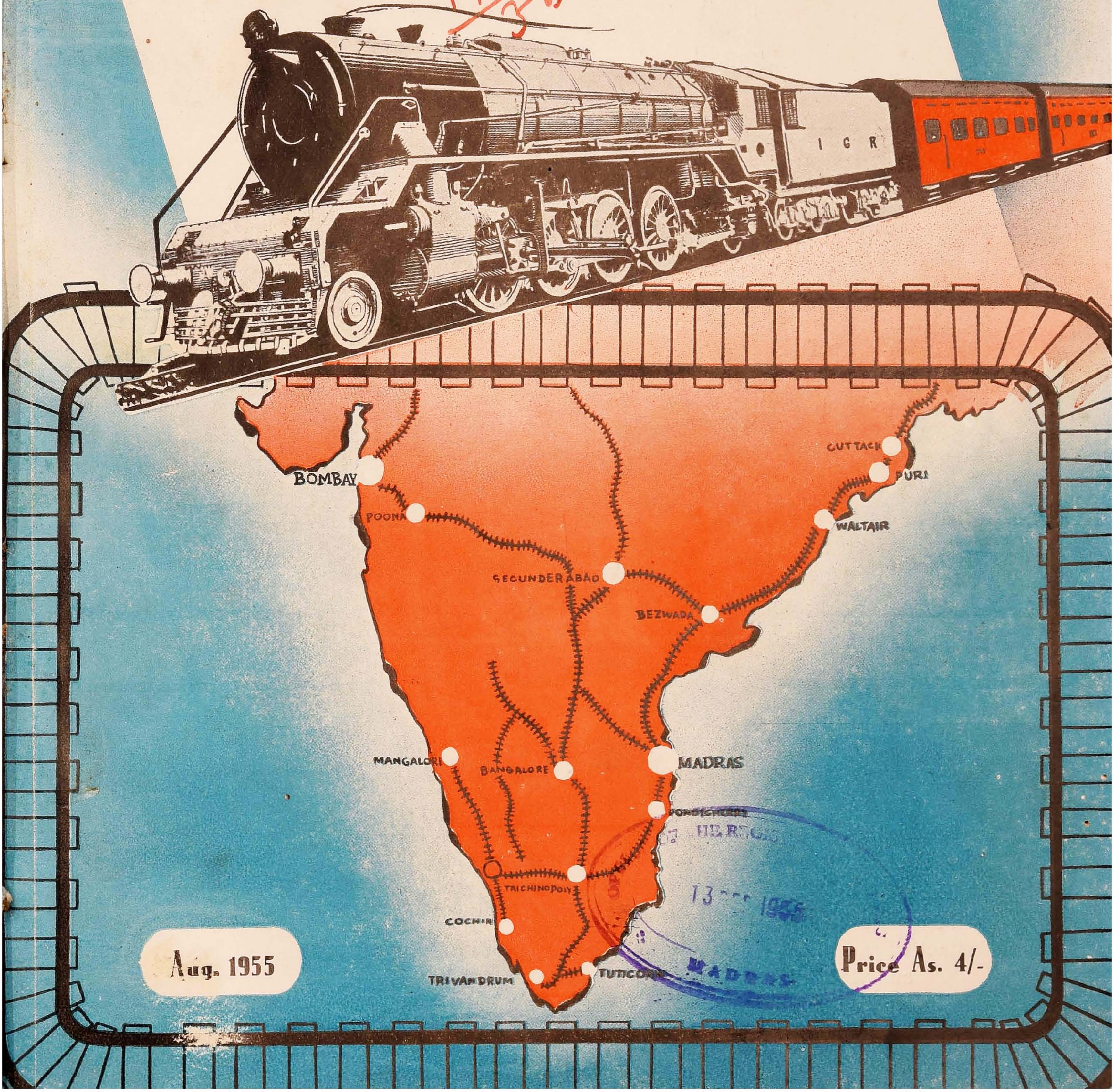

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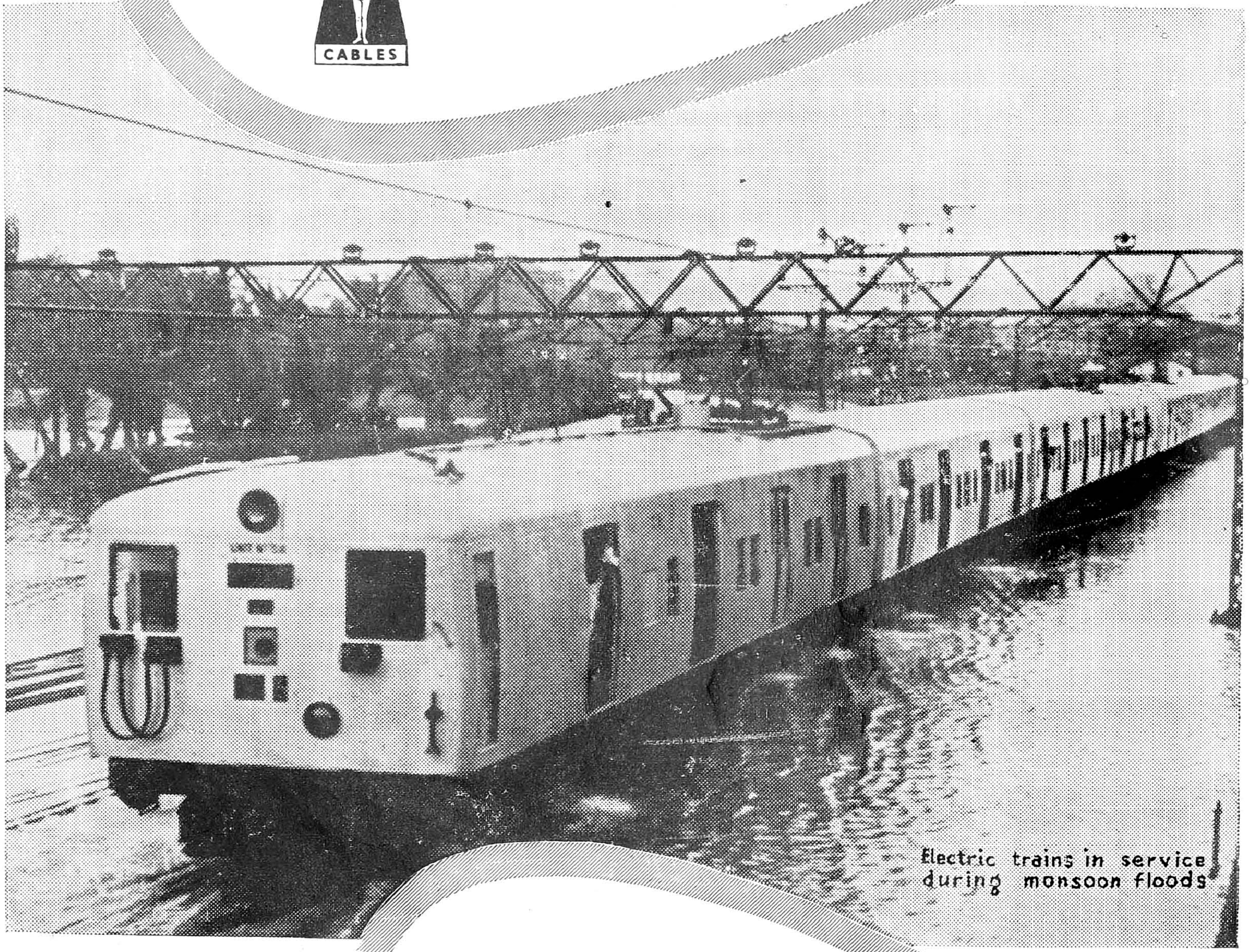

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HOW TO RESERVE ACCOMMODATION

Unless you reserve your berth (I and II Class) or Seat (Inter and 3rd Class long distance) in advance, you may not be sure of getting accommodation on the train you wish to travel by.

Application should be made to the Station Master of your starting station at least 3 days in advance specifying the date and train by which you intend travelling and the tickets must be bought in advance. The reservation fee leviable is 8 annas per seat or berth.

Reservation by I and II Class from intermediate stations by Express trains can also be made similarly, but reservation ticket can be issued only after getting an advice from the Reservation Centre that the reservation has been made.

Tickets will be issued only if accommodation is available.

If the reserved seats or berths are not occupied at least 5 minutes before the booked departure of the train the reservation will be cancelled and the seat or berth given away to another.

Reservation fee is not refundable.

III Class seats are also reservable on Express and certain other important trains for long distance passengers from the train-starting stations on payment of a reservation fee of four annas per seat.

Do not occupy a berth or seat reserved for another, as you are liable to be displaced at the last moment.

If you find another person occupying the berth or seat reserved for you and if he will not vacate it on demand, report it to the Guard or Station Master. They will help you.

(Inserted in the interests of Travelling Public by the Public Relations Officer, Southern Railways Magazine)

MESSAGES

Raj Bhavan,
Guindy, Madras.

11th June, 1955.

I am happy to know that a Special Number of the Southern Railways Magazine is to be brought out on the occasion of its sixth anniversary. I send it my warm greetings and best wishes.

I have no doubt that this useful publication will continue its service to our railways as an institution and to the countless persons who untilise it for purposes of transport as well as to the million men who serve it so faithfully and so efficiently.

It is my earnest prayer that the usefulness of our railway system may increase from day to day and that those who work in it may prosper and be happy.

Sri Prakasa

सत्यमेव जयते

Raj Bhavan,
Pachmarhi.

8th June, 1955.

The Railways are no longer a department of bureaucracy. They rather represent the ministrant side of a Welfare State. In this view, therefore, the Railway Minister is constantly engaged in studying the comforts of the passengers and the places where new lines have to be opened and old lines have to be improved. The Railways bear the brunt of industrial progress too. If a coal mine is discovered, or if an iron quarry has to be exploited or if a manganese *mountain* (that is literally so) has to be dug down, the Railways must be taken near to them to convey the raw materials. The Railways then, like roads and navigation, serve an important accessory purpose. Their development therefore cannot be conditioned and controlled solely by the comforts and conveniences of the people of any particular part of the country. The exploitation of the *wealth* of every part of the country is also a concerned factor. We must therefore be circumspect in demanding the expansion of railway service and leave a margin for reconciling the needs of industry with the demands of the people.

B. Pattabhi Sitaramayya

GOVERNOR UNITED PROVINCES

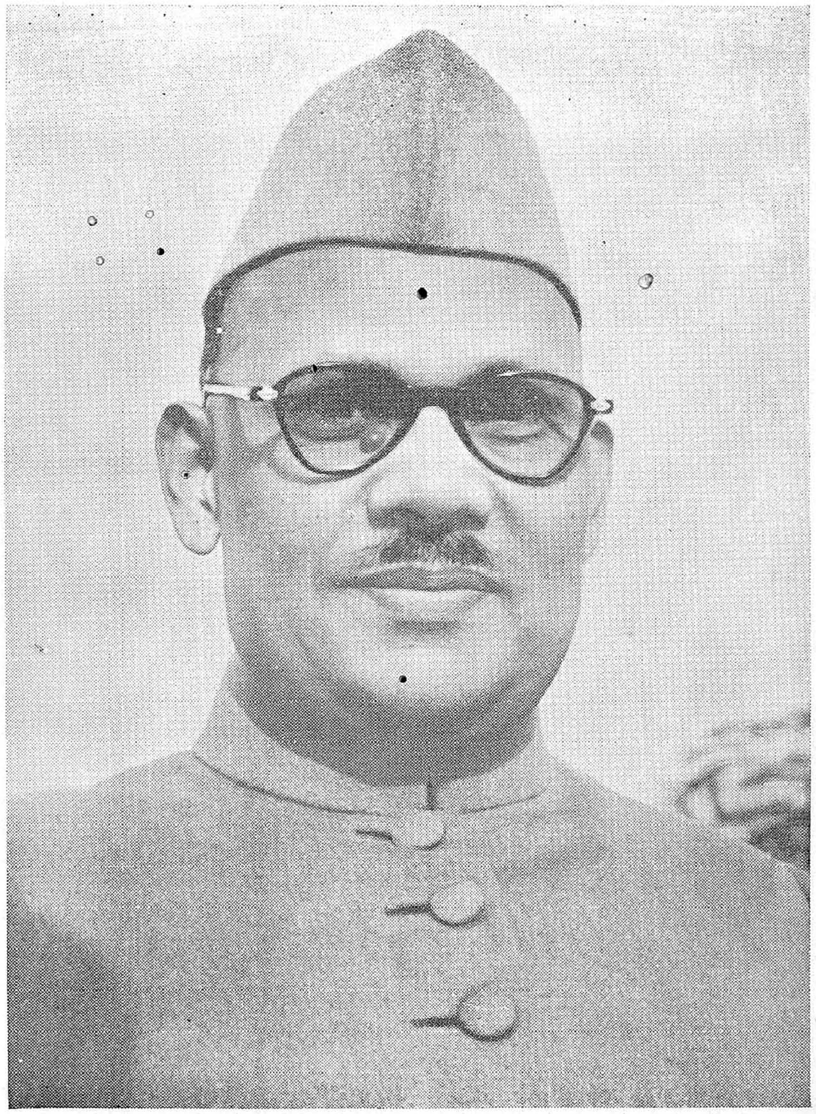
Governor's Camp,
Uttar Pradesh,

13th June, 1955.

I am glad to here that a special number of the Southern Railways Magazine is being brought out on the occasion of its sixth anniversary. Such a periodical, as I said in an earlier message, would help the public in realizing the unity and greatness of our Motherland.

The Indian Railways are playing a great part in the national life of the country by breaking the barriers of regions and regional exclusiveness. They are trying, every year, to increase the amenities available to the travelling public and a magazine like this can focus attention to the needs and wants of the public as well as to the new measures taken to satisfy them. It can also be a source of pleasure and instruction to railway workers themselves.

I wish the Magazine a career of service and usefulness to the country.



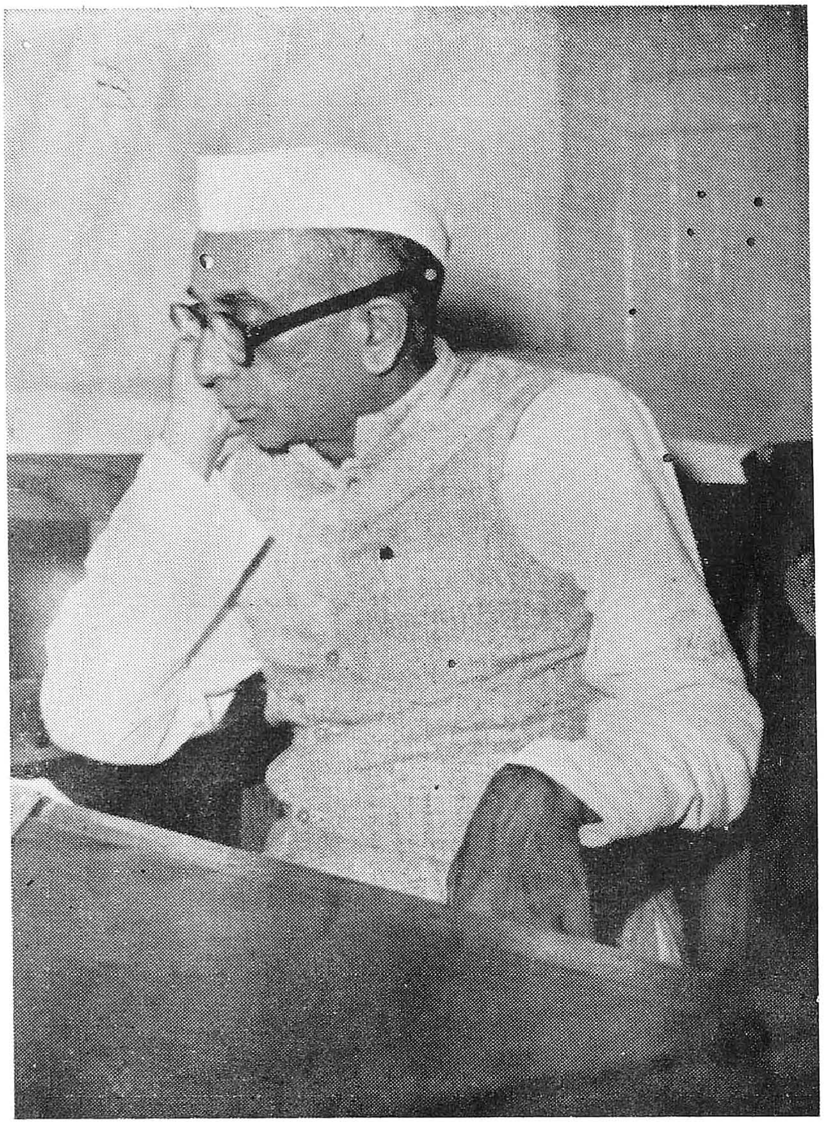
Raj Bhavan,
Simla.

8th July, 1955.

From your letter of the 1st June, 1955, I was pleased to learn that you are bringing out, as usual, a Special Number on the Sixth Anniversary of the Southern Railways Magazine by the end of August next.

If we want to build a strong and prosperous nation each one of us must work in a spirit of true national service and put the country before self. The railways constitute a great public utility service and obviously, therefore, on the railwaymen devolves a very onerous responsibility towards the achievement of that end particularly when the railways are the mainstay of a country's economic structure. They must uphold highest standards of efficiency and discipline. Besides seeking to promote the welfare of railwaymen which is its primary objective, mutual understanding between the travelling public and the railway administration is also one of the laudable aims of the Southern Railways Magazine.

I wish the Special Number of the Southern Railways Magazine all success.



Raj Niwas,
Rewa.

9th June, 1955.

The major problems of the Indian Railways may be stated as follows :—

(1) The Indian Railways are improving their techniques in all directions, but still they have not fully caught up with the most advanced techniques in other parts of the world ;

(2) The Indian Railways are steadily improving the amenities available to the passengers and facilities for the transport of parcels and goods, but still there is a significant gap between what will satisfy the passengers and the business community and the actual progress made in these directions ;

(3) The conditions of workers in the railways are steadily improving, but still they are far from having a contented staff.

It may not be possible to bridge all these gaps completely, but it must be the duty of every thinker on railway problems to discover ways and means of continual lessening of each of these gaps.

I hope the Southern Railways Magazine will endeavour to perform this task.

Government of India,
Ministry of Railways
(Railway Board)
New Delhi.

4th June, 1955.

I am glad to learn that the Southern Railways Magazine is completing the sixth year of its life and that you are bringing out a special number on the occasion. You have been editing an interesting and readable Magazine and I trust that you will continue to maintain the standard you have set for yourself.

(K.P.Mushran)

Governor's Camp,
Andhra.

6th June, 1955.

I am glad to learn that the "Southern Railways Magazine" proposes to publish a special number on the occasion of its anniversary. The Magazine is doing useful work and I wish it ever increasing success.

Indian Railways
Integral Coach Factory,
Perambur, Madras-23.

4th June, 1955.

On the occasion of the Sixth Anniversary of the Southern Railways Magazine I wish to send my warmest felicitations to the Managing Editor of the Magazine, Shri T. S. Krishna Rao. The Southern Railways Magazine has built up a reputation for itself as a high class Magazine of considerable interest to railwaymen in South India. Besides providing the reader very interesting matter in the way of short stories, humorous tit bits, etc., the Southern Railways Magazine also has been publishing very valuable articles of high technical interest to railwaymen, covering the whole range of railway operations. I have no doubt that in the years to come this Magazine will grow from strength to strength, and continue to render public service in ever increasing measure to railwaymen and to all those interested in the railway system of the country.

K. Sadagopan

IN YOUR OWN INTERESTS

HOW TO PURCHASE TICKETS

Buy your tickets only at the proper place. The authorised offices are (i) the Booking offices at the railway stations, (ii) the Town or City Booking Offices, (iii) the out-Agencies, (iv) Travel Agents. Never buy tickets from any other source as that may lead you to trouble. Please note that tickets are not transferable.

Buy your tickets in the proper time. You can avoid unnecessary excitement and trouble if you come to the station in good time, that is at least half an hour before the scheduled departure of your train. The Time Tables of the Railway are on sale at Booking Offices and Bookstalls.

Buy your tickets in the proper manner. Queue up at the Booking Window and you can get your ticket easier and quicker than by crowding at the counter.

By handing in the *exact fare in good coins or currency* you get the ticket easier and quicker, and save for yourself and the Booking Clerk time and trouble.

Check up your ticket and money before leaving the counter and draw the attention of the Booking Clerk to any discrepancy you may notice.

(Inserted in the interests of Travelling Public)

ALUMINIUM PAINT FOR THE RAILWAYS

By P. G. V. Ramanan

THE special advantages of aluminium paint have caused its wide acceptance as a decorative and protective coat on railway structures and rolling stock. Good quality aluminium paint is not only bright and attractive in appearance; it is superior to other paints in combining excellent resistance to the weather and to many types of corrosive atmosphere, high reflectivity to light and heat, and good hiding power; it is unsurpassed in the protection it affords to all kinds of surfaces and, not least, in economy of use. These features, while recommending themselves for use in a wide variety of industrial and domestic applications, have a special appeal for the railways were structures and equipment are subjected to the exceptional stress and strain of the traffic and the weather.

Among the structures on which the aluminium paint can and is now used with advantage by the Indian Railways, are bridges, pedestrian overbridges, station platform roofs, oil tanks, water tanks, signal shelters, signalling equipment, fencing, gates, etc. Another important use is the painting of the carriage roofs and wagons.

PROTECTIVE EFFICIENCY

On account of the unique characteristic of "leafing" (which is the phenomenon of the tiny flakes of aluminium of which the pigment is made, rising to the surface of the paint film and arranging themselves in overlapping layers and forming an opaque metallic barrier), aluminium paint has exceptional durability. The chief causes of deterioration in paint films are the penetration of moisture and the effect of light on them. In the usual granular paint films, moisture takes a direct path through the pigment, whereas in aluminium paint, its passage between the overlapping flakes is long and circuitous, with the result that deterioration due to this cause is very much slower. Breakdown due to light rays is also minimized, for the layer of metal acts as a shield to the vehicle beneath it. This paint lasts longer in industrial and marine atmospheres as it shares the pure metal's resistance to attack. Unlike lead pigments, for example, it is not discoloured by sulphur-bearing fumes and resists acedic atmospheres better than most other paints. Its widespread use by the sea-side testifies to its effectiveness in withstanding salt-laden atmospheres which cause the rapid deterioration of other paints.

REFLECTIVITY

Aluminium paint's high reflectivity to heat and light is perhaps its best known characteristic. It is therefore an extremely valuable paint in a country like India for painting the workshops both exterior and interior, roofs of carriages, petrol tank wagons, station platforms etc.

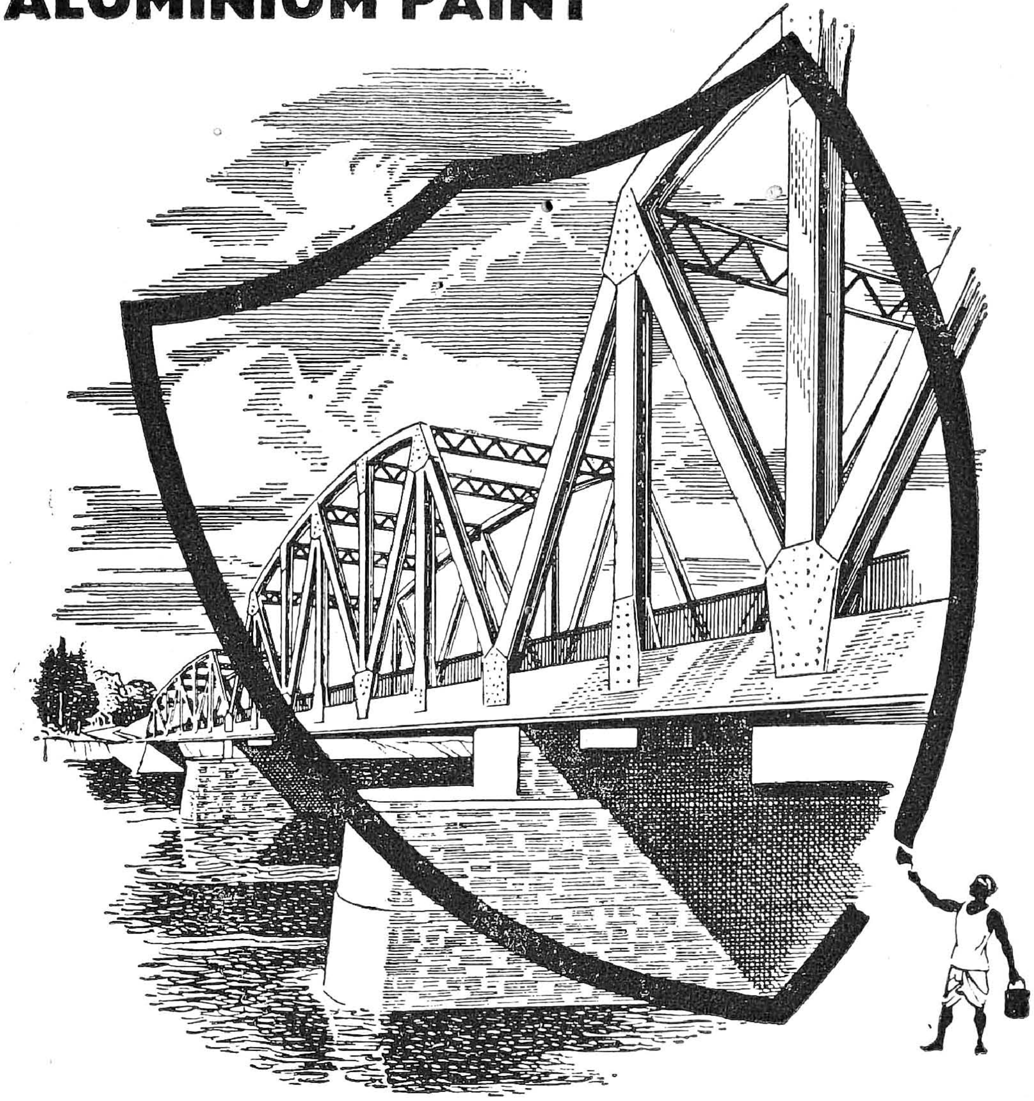
ECONOMY OF USE

The quality of leafing gives aluminium paint exceptional hiding power. One coat is sufficient to obliterate the underlying surface, whatever its colour. Oil stains, tar and surfaces of a type that bleed through other paints, can also be successfully covered, though where the stains are particularly soluble in the paint, a second coat may be necessary. Coupled with the hiding power is the excellent coverage which it gives—a feature in which it is generally superior to other paints. Coverage varies with the consistency of the paint, the method of application and type of surface painted. A gallon will cover about 700 sq. ft. of smooth metal when applied with a brush and about 600 sq. ft. when sprayed. Coverages of 900 sq. ft. per gallon have been obtained in bridge painting in India. In 1951 an area of over 20 lakh sq. ft. was painted with two coats of aluminium on the Howrah Bridge across the Hoogly in West Bengal, and a coverage of over 900 sq. ft. per gallon was obtained.

OTHER ADVANTAGES

Aluminium paint has an extra eye-appeal on account of its bright silvery effect. Its clean and lustrous appearance is particularly well suited to many environments, both exterior and interior. It cuts labour costs because of the better labour output arising from its lower weight and resultant handling advantage. Moreover, it is readily available in India from almost all organised paint manufacturers. Its pigment is locally produced by a Plant located in Bombay which has enough capacity to take care of the entire requirements of India.

ALUMINIUM PAINT



a shield against corrosion

Whenever a surface is exposed to the ravages of sun, rain and moisture, protecting it from corrosion becomes a major problem. Experience proves that for effective protection there is nothing like aluminium paint made from INDAL Aluminium Paste. The tiny flat plates of metallic aluminium in INDAL Aluminium Paste 'leaf' to form an overlapping layer of armour in the paint film. This layer excludes both moisture and ultra-violet rays ensuring long life of the painted surface. It pays to use aluminium paint because it has a coverage of about 900 sq. ft. per gallon.

Contact your paint supplier and specify INDAL Aluminium Paste

INDAL

INDIAN ALUMINIUM COMPANY LIMITED

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Motor Transport Industry—Certain Impediments

By P. N. Nagaswamy, B.A., M.L.

THE Planning Commission has reviewed the policy regarding Road Transport Development under the Five Year Plan and has advised the State Governments that no scheme for nationalisation in regard to road haulage service need be considered till the end of the Second Five Year Plan (i. e. till 1961) and permits for goods vehicles should be freely granted under the provisions of the Motor Vehicles Act and special incentive should be shown to viable units by granting them permits for a longer period of 5 years. In the Commission's view, appreciable investments will certainly be forthcoming from the private sector for the running of road transport services.

It cannot be contraverted that there is still bottle-neck in transport of goods by railways and the only remedy for quick transport of goods, agricultural products and merchandise is by the liberal issue of permits for goods vehicles and also by removal of restrictions in the distance as well as the area of operation of such goods vehicles. Now that the State Government is collecting the highest taxes in respect of these vehicles both by way of quarterly tax as well as surcharge on freight, it is but just that the Government relaxes restrictions in the operation of goods vehicles in number, area and the length of the route in operation. The adoption of such a liberal licensing policy will certainly ease the traffic congestion in goods transport in the state especially in view of the increase in production in every field.

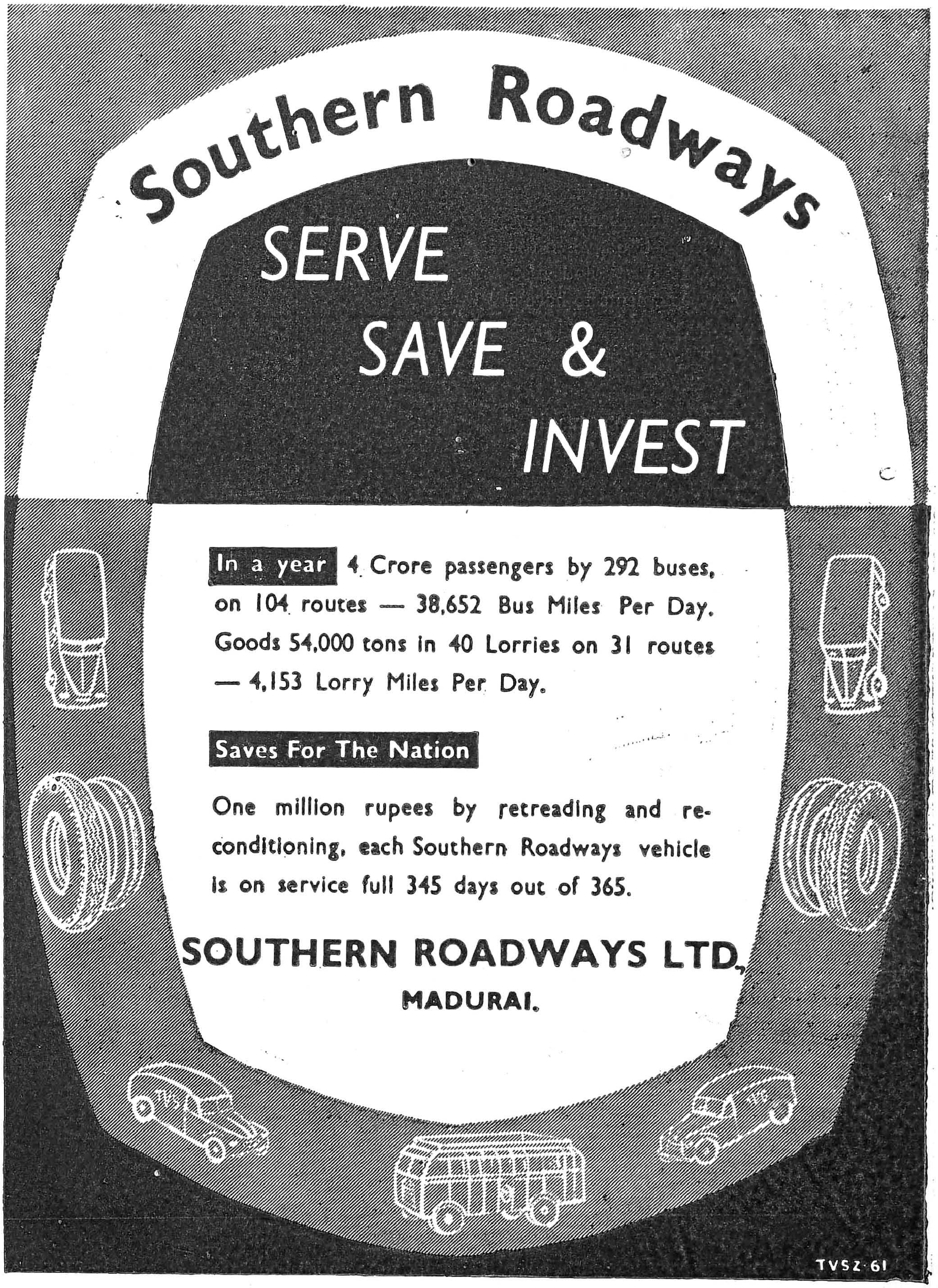
So far as the passenger transport by road is concerned, the Planning Commission have advised phased programme of Nationalisation in this field, for consideration by the Planning Commission for inclusion in the Second Five Year Plan. They have specially emphasised that the encouragement should be given to the formation of viable units in operation of passenger transport services. The reason for such encouragement in quite obvious. It is only large and viable units that can command financial resources and workshop facilities for giving the people quick, safe comfortable and cheap service.

It is only such units that do and can pay and treat labour well and also discharge their obligations to the public and Government. In pursuance of this recommendation the Madras Government have defined the viable unit as owning 10 buses and more, though they could have made the number as at least 20 and granted some priority to such viable units in the issue of further permits. But the so-called small operators and new adventurers have raised an unjustified cry that this policy of 10 buses forming a viable unit should be changed. Passenger transport is a specialised industry and only people with experience and adequate financial resources and workshop facilities can operate the service efficiently to the satisfaction of the public and the authorities. It is a matter of common knowledge that buses which are more than 10 or 12 years old are still on the road and the operators could not see their way to replace them by latter model or newer vehicles. The only reason that can be assigned to this is either unwillingness to invest larger capital or inability to do so. Certainly the travelling public are entitled to more comfortable travel for the fare they are paying. The Government have to courageously act and say definitely that only large and viable units will be given encouragement in future and that smaller units can amolgamate and form themselves into big and viable units. Interests of travelling public is certainly paramount to the private interests.

Yet another obstacle in the way of quick development of Motor Transport Industry is the heavy taxation levied on Motor Vehicles both by the Centre as well as by the State Government. The Motor Vehicles taxes levied by the Madras Government is the highest in the world. The Government of Madras in addition to the motor vehicles tax have imposed a surcharge on passenger fares and freights. The transport operators have already been paying heavy taxes to the Centre by way of duty on motor spirit excise duty on tyres, and the State Sales Tax in respect of motor spirit, parts, vehicles, etc.

That this taxation is the sole reason for the retordation in the motor transport industry will be clear from the fact that while the average increase in number of motor vehicles in the country was about 12% per annum before 1950-51, the increase has dropped down to 3.7% per annum from 1951 onwards, especially when the transport needs other than those provided by Railways is calculated to have increased by 35%. If this State of low consumption of motor vehicles are allowed to continue it is bound to affect the Five Year Plan, which aims at very great increase in production and with the increase of production the facilities for transport has also to be necessarily increased. This low consumption of Motor Vehicles will also certainly affect the growth of our National auto-

(Continued on page 14)


Southern Roadways
SERVE
SAVE &
INVEST
In a year
4 Crore passengers by 292 buses, on 104 routes — 38,652 Bus Miles Per Day. Goods 54,000 tons in 40 Lorries on 31 routes — 4,153 Lorry Miles Per Day.
Saves For The Nation
One million rupees by retreading and reconditioning, each Southern Roadways vehicle is on service full 345 days out of 365.
SOUTHERN ROADWAYS LTD.,
MADURAI.
TVSZ 61

WHY SHOULD I DRINK TEA?

I am an ordinary man. I work from sunrise to sunset. I have little time and money to spare. So, why should I drink tea?

I'll tell you....

TEA—THE SPIRIT OF GOOD CHEER!

I drink tea and I will never give up drinking tea. I know what it feels like when the mouth runs dry, when the eyes grow dim with fatigue, when the back aches, when the body wants to lie down and rest. I know what a joy it is in these heavy moments to have a cup of tea—those first few sips wake you up and soon you are ready again for the day's work.

Like millions of other workers, I know that tea is a necessity.

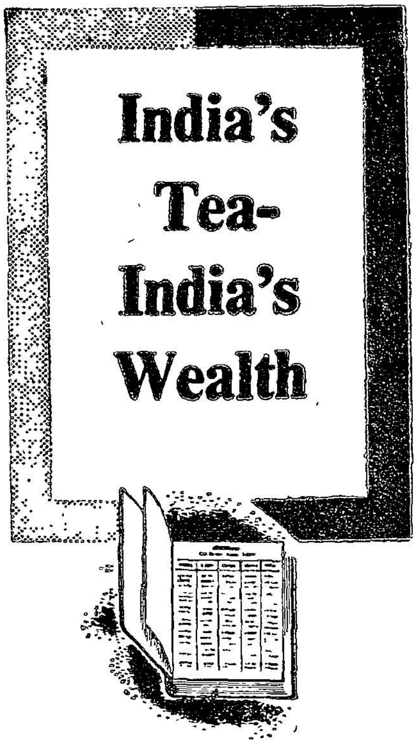
There are different types of workers. There are the thousands who work in factories. They are provided with tea canteens because factory work tends to become monotonous. Tea is a safe liquid refreshment which helps the factory worker keep cheerful at his work.

In the city, there are those who work in offices with pen and paper or typewriter, those who work out in the sun selling goods or pushing carts or driving buses and lorries and trams or repairing roads. All these workers drink lots of tea because life in the city is always in a hurry and city workers feel the strain and tire quickly.

The need for tea is urgent, that is why there are thousands of tea shops where people relieve the monotony by refreshing themselves with a harmless cup of tea and a friendly chat. There are not only tea shops in nearly every street and lane, but there are also vendors who roam busy localities serving tea in cups or earthern pots to the thirsty wayfarer or to the long queues leading up to the sports grounds or cinemas.

THE WORLD OVER DRINKS TEA!

Everybody wants Tea. So do I.



REVENUE:

The Indian Tea Industry contributed to the National Exchequer Rs. 19 crores as export duty, and over Rs. 3 crores as central excise duty in 1954-55. Besides, it contributed large sums by way of State income tax, agricultural tax, road tax and certain imposts.

TEA BOARD INDIA

No other drink refreshes you so much, yet costs so little as **TEA**

FST 139

(*Continued from page 12*)

mobile manufacturing industry to a large extent. The heavy taxes levied on the motor industry is also reflected in the large number of old model and ricketty vehicles still on the roads. If the motor transport industry is to make a good progress to keep in line with the increased production and raising of the standard of living according to the Five Year Plan then it is absolutely necessary that both Centre and the State Government should reduce the taxes under the various heads imposed on motor vehicles substantially.

Indian tea is drunk by many more people outside India. The Englishma practically lives on tea. His country takes over 327 million pounds of Indian tea every year. The America comes next with over 40 million pounds. Every year more and more tea is being drunk by the Egyptian, the Canadian, the Irishman, the Dutchman, the German and many others. These people have discovered that tea is cooling in summer and warming in winter. They have, in fact, discovered the magic of Indian tea.

TEA IS A MAJOR NATIONAL INDUSTRY!

Anybody knows that if more people outside India drink Indian tea then more money must come into our hands. (As a matter of fact, during 1954 India obtained in foreign exchange over Rs. 131 crores through the sale of Indian tea—450 million lbs. to countries abroad). It means that I am going to see my country grow before my eyes. I will see more people going to work because more industries will be built and there will be many more things to buy, more business for me, more money to buy the things I have wanted.

Besides what is earned by way of foreign exchange, tea also contributes to the National Exchequer Rs. 22 crores a year as Central Excise and Export Duty. All this revenue helps the Government to speed up those projects which will promote better living for my people.

MORE TEA—MORE PROSPERITY!

Looking back at the popularity steadily gained by tea in this country over the last two decades, I find that the total internal consumption stood at over 38 million lbs. in 1930–31; it doubled itself in six years and rose to 79 million lbs. in 1936–37. Although the consumption of tea in India has gone up phenomenally and stands today around 180 million lbs. a year, our per head consumption annually is only ½ lb. which is amongst the lowest in the world. To the extent to which we increase our own consumption we would be helping vast numbers of our own people to look forward to stable and progressively improving standards of living.

TEA GARDENS EMPLOY OVER ONE MILLION WORKERS!

There are over 6,000 gardens where tea is grown. These are spread over many parts of the country like Assam, Bihar, West Bengal, Kangra, the Nilgiris and Annamalai, making a total of nearly 800,000 acres. Over a million of my countrymen and women earn their livelihood by working in the tea gardens of India.

The workers in the tea gardens may be said to have developed a way of life of their own in which amenities like minimum wages, better housing, free education, facilities for recreation, hospitals, creches, etc., have been provided voluntarily and through Statutes. These amenities and other desirable economic gains, achieved by people earning their livelihood in one way or another from the manufacture and handling of tea, are dependent on the prosperity of the industry as a whole and would be in danger if tea became an exception to the general economic expansion of the country.

TEA PROMOTES OTHER INDUSTRIES!

The indirect benefits derived from tea are numerous. Thousands are employed in bringing tea to you and me. Besides, there are a host of other industries engaged in the development of the tea industry—coal, cement, fertiliser, each in turn helping the other. The plywood industry is of course one of the most important. Indian tea needs about 6 million plywood chests every year. A few years back, the major part of this requirement used to be imported from European countries; now it is almost wholly produced in India. Isn't that progress? When I think of the number of people gainfully employed in all these allied industries. I think of tea as truly our national drink.

TEA HAS NO SUBSTITUTE!

I say again, the need for tea is great. It is more invigorating than any other drink of its kind and in spite of the fact that one has to pay a little more for good tea, it is still the cheapest beverage. I get 250 cups from one pound of tea and that goes a long way for the price. There is no other substitute for tea which is so cheap and refreshing. I have found it beneficial and stimulating under all circumstances. Yes, I drink tea because it is indispensable to my living.

At the end of the day, I know how restful and cooling it is to sip tea, chatting with the family or with a friendly visitor who can join me over a cup. Tea is the only wholesome refreshment I can afford to offer. I am grateful to the many thousands who work for the Indian tea industry for they have made it possible for ordinary men like me to have the cheapest luxury in the world at any time—a cup of tea. So from all points of view, I have come to know that India's Tea is India's Wealth.

SHORT HISTORY OF RANSOMES

IN 1789 Robert Ransome, an ironmaster and inventor from Norwich, started his iron foundry in Ipswich, with a total capital of £200, and accompanied by one workman only. Such was the manner of the foundation of the firm of Ransomes Sims & Jefferies, Ltd., and while modest beginnings of great undertakings have been fairly common, it is a notable fact that in our long history, we have never lost our lead in the manufacture of the plough—our original product and still the principal agricultural implement.

At the time of his removal, Robert Ransome already held a patent for tempering with the aid of salt water, plough shares made of cast iron, but it was in 1803 that he made his revolutionary discovery of chilling the undersurface.

This led to the introduction of a type of share with the underside as hard as steel, and the upper portion comparatively soft and tough. In work, this share was self-sharpening, as the upper part wore just sufficiently to allow the hardened undersurface to maintain a sharp cutting edge. This new share was infinitely superior to those then in use, and it still remains popular in various parts of the world.

In 1808, Robert Ransome patented very considerable improvements in the construction of ploughs, making possible the easy replacement of wearing parts. Many features which are considered common practice by plough makers to-day date back to the plough bodies which he built at that time.

One of the comparatively early inventions sponsored by our Company was the Jefferies patent double wheel lifting apparatus. Prior to its introduction, double and multiple ploughs were not popular, as they were cumbersome and awkward to handle. This new feature, however, resulted in their coming into general use.

Early mechanical cultivation was, of course, carried out with the aid of steam power, and while the period now largely belongs to history, it was as pioneers in this field that we can claim to have made a valuable contribution to the development of the powerful multiple implements now in general use. Tractor plough manufacture owes much to our early work, and in this connection we must mention the introduction by us in 1919 of our self-lifting apparatus which made possible the one-man tractor ploughing outfit.

It is only in recent years that close-coupled hydraulically-lifted implements have become a familiar sight. To meet the new requirements we were early in the field developing our mounted ploughs, reversible ploughs, toolbar frames, disc harrows, etc., and our implements in this class have gained considerable popularity.

The large variety of ploughs and other implements which we make to-day satisfies the requirements of agriculturists all over the world. Besides share and disc ploughs for tractor and animal draught, we offer numerous other tillage implements including cultivators, disc harrows, sub-soilers, mole drainers, potato diggers, etc., for all conditions and all soils.

Before leaving the plough, brief mention must be made of the vast enterprise commenced by the Government of India for bringing into use millions of acres of land hitherto uncultivated. This is an agricultural scheme of unparallelled magnitude, and to Ransomes came the call for the ploughs required to carry out the undertaking. No fewer than 800 Supertracs, the world's mightiest ploughs, are at present employed on the project, and results have evoked high praise from famous agricultural experts and representatives of American industry. We are justly proud of our contribution to this great enterprise.

One of our most successful ventures in the last few years has been the production of a small track-laying tractor. This MG or market garden tractor can be used in conjection with a full range of appliances for ploughing, cultivating, hoeing, harrowing, ridging, rolling, spraying, grass mowing, etc., and has proved a wonderfully sound investment for market gardeners and small holders, as well as for farmers on a larger scale who require a small power unit for the lighter jobs. The MG has also proved its value for operating in confined spaces such as vineyards, orchards and glasshouses.

Another class of agricultural equipment which we produce is thrashing machinery, and our experience with this goes back for more than a century. As long ago as 1841 we exhibited a power-driven thrasher at the Royal Agricultural Society's Show at Liverpool, and later we patented a machine fitted with apparatus for chopping and bruising straw to make it fit for cattle fodder in hot countries. Our latest thrashes are fitted with all modern labour-saving devices which make them almost automatic in their action, and in addition to the ordinary types for dealing with wheat, barley, oats, etc., we supply machines for rice, clover, maize, sunflowers and other seeds, peanuts, etc., as well as balers for hay and straw.

The drying of crops is a question to which we have devoted years of careful study. Since 1933 we have been making, under Davies patents, driers for grass and

grain. By means of these, grass can be dried and stored for winter feeding, giving a food which has almost the same beneficial value as spring grazing. The driers can be used for hay-making in wet weather, and for drying grain and other crops. In order to make this type of drier available to a larger circle of farmers, we have recently introduced a smaller model capable of being operated by one man.

The development of scientific methods for dealing with insect pests, fungoid diseases and weeds resulted in our introducing spraying machines of various types, and these are now well known in many countries.

Just as the name "Ransomes" means "Plough" to the farmer, it is synonymous with "Lawn Mower" in the eyes of the discriminating public. We have always maintained an extremely high standard of quality, and our customers have realised that the higher prices are amply repaid by the saving on running and maintenance costs and the satisfactory service over a long period of years. One of the reasons for the excellence of our lawn mowers is the unrivalled experience we have had in the manufacture of these machines. In 1832 we made our first lawn mowers under Budding's Patent, in the specification for which it is claimed that

> "Country gentlemen will find in using my machine an amusing, useful and healthful exercise."

Considering that the machine, was driven by primitive gears, was very heavy and was 19 ins. wide, it is an open question whether the exercise was as amusing as Mr. Budding imagined. Nevertheless, this was the start of an industry which has grown year by year to its present huge dimensions.

In 1899, Mr. J. E. Ransome conceived the idea of utilising the internal combustion engine for driving a lawn mower, and under his direction the first petrol driven lawn mower was built and sold by us.

To-day, we offer a full range of machines for all classes of grass cutting, from the small suburban garden to the large sports ground, golf course or airfield, and from bowling greens to the rough grass of the orchard or roadside verge.

Amongst our manufactures, entirely distinct from agricultural and horticultural machinery are the electric industrial trucks. Actually, we were the first British makers of these vehicles, having commenced production about 35 years ago, and we are now firmly established in the world's markets. With our great experience of the problems involved, we are able to offer trucks for all classes of goods-handling, and the types available include trucks with fixed or elevating platforms from 1 to 4 tons capacity, crane trucks, tipping trucks, tiering trucks, forklift trucks and electric tractors.

We have mentioned below the principal manufactures with which we are now actively engaged. Many other products have been developed during our long history, some of which have been developed during our long history, some of which have been discontinued, and some have passed to other makers. In the early years of the 19th century we were one of the first to build cast iron bridges, and were among those prominent in supplying railway material during the great boom which attended the development of our present railway system. This part of the business was transferred to Messrs. Ransomes & Rapier Ltd., of Waterside Works, Ipswich, that company being specifically formed for the purpose.

Steam engines, portable, stationary and traction, were for many years one of our major productions, many thousands of various sizes being manufactured at Orwell Works.

During both World Wars we naturally carried on with the vital production of agricultural machinery, but we were also prominent in the manufacture of war material. It is interesting to note that during the first world war, we built nearly 800 aeroplanes, while between 1939 and 1945 we produced an enormous amount of war equipment, in spite of the fact that the factory was virtually in the front line for air attacks.

The present area occupied by the Ipswich Works amounts to about 45 acres. Three years ago we completed a really up-to-date foundry on the outskirts of the town, and plans are in hand for an entirely new implement factory.

Sales are entrusted to a network of reliable agents all over the world, and in two of our larger markets we have established subsidiaries—Ransomes South Africa (Proprietary) Ltd., with selling houses in Cape Town and Durban, and Ransomes S. R. L. in Buenos Aires, Argentina. In Scotland, our subsidiary company, Ransomes Sims & Jefferies (Scotland) Ltd., not only acts as our selling organisation in North Britain, but is also responsible for the production of certain types of implements.

Now, as throughout our history, research and development work go on uninterruptedly, and every year sees the introduction of new designs. Skilful

(Continued on page 18)

ROAD COMPETITION

By T. A. Narayana Iyer

DEVELOPMENTS OF SPECIAL WAGONS

THE advantages of special wagons, wagons suited to the nature of the commodity or livestock, are so well known and appreciated by the rail-users as well as the transporter, that there is no point in dwelling on here at any great length. The Tankwagons for patrol, kerozene and other petroleum products; the horsevans for the transport of costly race-horses; the sheep and duck-wagons, are all common even on the backward railways of the world. Their development took place in the past quite apart from any question of competition. We owe tankwagons in this country to the over-powering foreign interests that were predominant in this country, the two or three Oil Companies that had the sole monopoly of the markets for the mineral oils, and who had a powerful voice in the administration of the country then. There are certain indigenous oils peculiar to the country, such as the Cocoanut Oil, Groundnut Oil, and other edible vegetable oils, whose needs of transport have been and are pressing, being produced and obtainable in one corner of this sub-continent and required for consumption in distant parts of the country. Even when the Britishers were in control the needs were pressing, but it was not to their interests to cater to the needs of their transport. They were more interested in moving the oil seeds to the nearest ports for shipment to their own country or selling the seeds to other Europeon countries through the Bank of England. But after the Britishers have withdrawn what have we done for the bulk transport of our indigenous oil? Again, there are large quantities of perishables, such as Vegetables, plantain fruits and betel leaves and fish iced, which frequently get spoiled through delayed transport and transport in metal wagons of the ordinary kind entailing heavy payment of claims. The cry for insulated wooden wagons in sufficient number, if not frigidaired vans is there; but our transport fathers have not yet moved in that direction appreciably. We shall hope they will in the near future.

The advantages of the special wagons, esp. the ease of handling and moving them to the carriers themselves make it a further reason why the stock of special wagons should be extended. All the Railways recently consulted in Europe agreed that these special type wagons are of the greatest value to the railway when private owned, since the capital invested in them constitutes a close bond between the railway and the clients. All the Railways in Europe appear to be in favour of this development, which they encourage by various means.

In Luxenburgh free transport is provided for empty wagons. In Belgium the advantages are given in the form of a rebate per wagon-kilometre and a lower grading for certain goods. In France the rating of privately owned wagons was completely revised in 1948. According to this rating the French Railways pay the owner of the wagon a given sum for each journey made loaded, and the owner pays the French Railways for journeys empty. But whereas the empty rate formerly exceeded the given sum, the contrary now holds good. The rates and given sums have been so fixed that the capital the owner has invested in the wagons brings in a proper revenue, the higher when the ratio between the load and tare is closer.

However, whilst considering it preferable to leave it to private enterprise to build special wagons at its own expense, several railways have found it necessary to build some themselves and operate them either themselves or through an ancillary company.

The motives for this are stated to be as follows :—

(i) To meet the needs of clients whose financial situation makes it impossible (for example, too small a volume of traffic) to build a stock of wagons for their own use, or who do not wish to do so in order to retain complete liberty (Belgium);

(Continued from page 17)

craftsmanship and the use of high grade materials, supported by an efficient sales, maintenance and repair organisation, contribute to the continued satisfaction of our world-wide clientele. Modern methods have as one of their main objects the speeding up of processes of manufacture with resulting increase of output, and it would be only natural if standards in some instances tended to fall. While fully recognising the necessity for keeping abrest of the times, we have set our faces against any lowering of the high standards we have always maintained, and we think we can claim with some justification that our extensive overseas sales help to keep up the reputation for quality which British manufacturers have always enjoyed abroad.

(ii) To make good temporary shortages in the stock of certain firms (Tunisia);

(iii) To be able to transport perishable goods under good conditions in their own wagons (Denmark, Norway);

(iv) To be able to meet requests to carry out organised bulk transport (Morocco, Tunisia);

(v) To put prototypes in service in order to encourage the firms to which they are rented to get similar one (France);

The French National Railways leaves the operation of its Refrigerator and large capacity wagons in the hands of affiliated companies, who get a better use out of these wagons than any private firm could, and better than the railway could, as it would have less freedom in the matter than the affiliated company. It is the same in Morocco, where the iso-thermic wagons are operated by a company specialising in this kind of transport, which assists the railway in obtaining a traffic, for which it is commercially organised.

OTHER MEASURES

Amongst the other measures connected with transport conditions, taken to freight competition, mention must be made of :—

(a) the facility given to consignors to load goods for several consignees living in places served by or from the same station in a single wagon (Switzerland and Denmark) or in two different localities on the same route (Denmark) when the rates for full wagon loads apply.

(b) organisation of a service to collect empties at the premises of several clients, which are then grouped together and sent in a single consignment to the same consignee, under whose orders they have been collected (Switzerland);

(c) supplying wagons without a preliminary request (Switzerland)

(d) the acceptance of consignments outside official hours (Switzerland).

CONDITIONS IN INDIA

These inducements can be tried with advantage in India too to secure the continued patronage of the clientele from the community of Traders, Industrialists and Agriculturists.

During the years intervening between the two World Wars, more particularly the twenties, road competition with the railways grew almost to an unassailable position, and the railways, both state-managed and company-managed were hard-put to keep their normal traffic to the rail. Even during the first few years of World War II when petrol became scarce or was controlled with a view to conserve for war-purposes, the competitors developed the producer-gas engines for propulsion at very cheap costs and made it almost impossible for the railways to make both ends meet. But lack of spare parts, tyres etc. soon put them out of use, and entire traffic available turned to the rail. But the war had requisitioned most of the vehicles, the periodic overhaul for the rolling stock could not be given, as the workshops had all been geared to war production, and there was a dearth of rolling stock. Virtually the latter half of the war years, the early forties, put the monopoly of transport again into the hands of the railways. Naturally there arose the inflated demands for wagons, which were in short supply, and the railway devised a means of restricting the demands to obsolute requirements by imposing the Registration Fee, Rs. 25 per Metre Gauge Wagon and Rs. 35 per Broad Gauge Wagon. Conditions have since become easy both for the rail and road hauliers; competition has set in once again, as will be revealed by the falling statistics on the railway and the rising statistics on the road transport concerns. The war has also taught the competitors to a higher degree than before the art and science of economic and efficient transport. There are today in the fields such services as the T. V. S. in the south, which have won approbation and reliability all round for their Parcels and Passenger services. The disabilities on traffic now persisting, the legacy of World War II, such as the Registration Fee, un-overhauled leaky wagons, extra-ordinary and despair-delays to correspondence, etc. can be removed. These evils might have disappeared with the import of new engines, wagons, etc. but for the integration of railways and their centralisation, which have thrown in between the server and the served longer distances, the results being ineffective attention, delay etc. There has come about a campaign for PASSENGER AMENITIES. A campaign of equal virulence is essential for AMENITIES to CONSIGNORS AND CONSIGNEES.

COGS IN THE WHEEL

By Ajax

I was once asked if I had crossed the '*efficiency bar*'. I could not at first grasp exactly what was meant, but, on reflection I remembered that there is an efficiency bar test— a hurdle to be crossed—in the career of a railway servant. That is to say, that after a few stages in the incremental scale of pay, one has to qualify himself at a written test and a viva voce interview in order to earn his further increment in that time scale of pay. This barrier is called the efficiency bar.

I wonder why it is called so, for efficiency is not a commodity that could be purchased; it is a thing to be acquired gradually by dint of one's own efforts and aptitude for work. Naturally, if one has been doing a certain kind of work for a number of years he would attain proficiency in it and would be considered as having been qualified and fit to hold the position. And as such if his efficiency is to be tested and certified as up to the mark, is it not an unnecessary adornment?

Again, suppose that a certain employee fails in the test. Does that mean that his efficiency in doing the job that he has been doing for long has suddenly deteriorated, and, if that be so, would it not be worth while probing into the causes thereof and remedying them first? Does the crossing of the efficiency bar mean added efficiency? Is it a fact that overnight and individual suddenly transforms himself into an aceme of efficiency?

As none of these things do happen I have been wondering if in reality any useful purpose is being served by the condition of an efficiency bar in the career of an employee.

I have not known of any such conditions in the sphere of private employment where the only criterion is efficiency. Although time scales of pay have nowadays become an essential feature of employment in mercantile firms etc., they have not prescribed any efficiency bar test in their employment, and from all appearances, it would seem that efficiency of work is at a high pitch in mercantile business houses.

Scanning through the time scales of pay I find that ordinarily the first efficiency bar test is reached somewhere between 10 and 15 years of service and the second bar—for in most cases there are two barriers—at about the 22nd or 25th year of service. This is only generally speaking. That means when one is engaged on a job for this length of time he has to submit himself for a test and qualify at it and then earn his further increment. If he fails then he has to wait for another chance—may be after six months, if that is specifically mentioned, or a year. The cumulative effect of this failure is that he loses one stage of increment for the rest of his career. Failures at subsequent tests are rare, but supposing one fails consistently at two or three tests, what happens? Is he removed from his job, or punished for his successive failures? I would be glad if any of my readers would enlighten me on this contingency.

Picture to yourself the metamorphosis of an employee on the threshold of an efficiency bar test. To some the hurdle is a disgust, to others it has a nuisance value—is it unparliamentary?—and yet to some others it is a paradox. Their line of argument is that seasoned as they are in their own sphere of work, why should it be necessary for them to be tested like school boys and certified to have passed an '*examination*'. Where is the room for doubting their efficiency unless no credence is given to human nature and failings. As age advances and experience is gained efficiency does not deteriorate, and, if it all goes down, then there are other ways of warming up the individual than subjecting him to this '*Schooling*' test.

I said it was a paradox. Let me explain it. Suppose an employee is away on deputation to some other department for a number of years. His nature of work in the new department is entirely different to what it was in his parent office. And in course of time his turn for passing the efficiency bar test in his parent office in the scale of pay that he held there comes and he is asked to submit himself for the test. The employee hesitates for he is long out of touch with his parent office and he fears that he might fail in his test if he is questioned on the work which he was supposed to be doing if he were still in his original office. So he tries to put off the test on some pretext or other but ultimately he has to qualify if his incremental stage is to be passed. This attitude is not conducive to his efficient working in the office where he is on deputation.

Another instance is that an employee fills a higher position and is asked to cross his efficiency bar in the lower scale of pay where he holds a substantive line although the nature of work is the same, i. e., clerical. This often happens in the ministerial cadre and I have heard friends talking about these lightly. They seem to

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COST ACCOUNTING ON RAILWAYS

By P. H. S. Rao

THE Railways are engaged in the business of transportation to make a profit. To make a profit they must produce and sell transportation service and the profit is represented by the difference between the production costs and the selling price of the service. From this point of view a railway operates under the same principles as any other manufacturing concern. A manufacturer buys raw materials, employs labour and gives facilities to convert this raw material into finished products. Similarly the railways buy materials, supplies and rolling stock. They instal an expensive plant and employ the staff to operate it, the result of the operation being the transportation service which is sold to the merchants and the travelling public. This is anologous to the finished product of the manufacturer.

Now, it is but natural that a railway administration desires to know what it costs to furnish this service and the cost of the several individual items that enter into the production of this service. For instance, it may want to know what it costs to run a train, to operate a shop or to furnish a certain kind of transportation service such as dining car service. It may want to know the cost of a particular operation and the manufacturing costs at its workshops.

DEFINITION AND PURPOSE OF COST ACCOUNTING

Cost accounting is the accounting procedure involved in determining the cost of any service or operation.

While the general accounting is intended to determine the profit and loss of the business as a whole, the purpose of cost account is to bring out the cost of performing a service operation, running a particular department, producing a unit or giving certain class of transportation service. This cost figure, when used in connection with the revenue received from any specific service will help to determine the profit or loss from that service. Cost accounting, therefore, is "accounting for units" as compared to the purpose of general accounting of "accounting for the business."

GROUPING OF COSTS IN RAILWAY OPERATION

The cost figures required may be divided into four groups viz.,

1. Costs of service
2. Costs of operation
3. Costs of manufacturing
4. Costs of facilities

1. The service costs represent the costs of furnishing the various services rendered by the railway. These costs are used largely to determine the adequacy of the rates charged. They include the cost of goods service (per ton mile); cost of passenger service (per passenger mile); cost of dining car service (per meal) and the various kinds of transportation service offered.

2. Cost of operation are the costs of performing the various processes which are included in the term, railway operations. These figures are used for administrative purposes by the management. They include the cost of laying and relaying rails and sleepers, ballasting

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think that a stage has now reached wherein a go by is to be given to such restrictions in the conditions of service.

Long before the anxious day of the ordeal arrives, clerks who have to pass through this barrier spend disturbed nights. They scan through rules and regulations, procedure orders and other books to familiarise themselves and ask their colleagues for a helping hand in regard to brushing up their knowledge. They try to divine what sort of questions would be asked and what brief answers they should give. They are reminded of their school days and their children at home make fun of them saying that '*daddy is preparing for an examination*', and involuntarily pray that he should fail so that they (the children) may not be rebuked for their failures in class examinations.

To my mind the efficiency bar is an anachronism. During the pre-independence days there was perhaps some meaning in this test as it served a ready weapon to reprimand recalcitrant employees. Perhaps it also served as a disciplinary measure and was a watchdog. Whatever usefulness it might have served I think it is time that some thought is expended on this aspect in the rivision of the civil service regulations that seems to be in the offing according to Chanda's Report. If this article provokes some thoughts in this direction it might not have been written in vain.

track, the cost of running trains, of repairing locomotives or any other individual operation on which cost data are sought.

3. Costs incurred by railway in manufacturing parts, material and equipment are known as manufacturing costs. These include the costs for rebuilding coaches and locomotives, for operating timber treating plants and other shop manufacturing processes.

4. The cost of erecting and rebuilding the physical plant of the railway including tracks, bridges, buildings, signals etc. represent the cost of facilities. These cost figures are used both for administrative and rate-making purposes.

In commercial or factory accounting this last group would not be considered in any system of cost accounting. But this is a very important factor in the railway industry because of the huge investments in a railway plant and the necessity for administrative control over the large annual expenditures, the costs of improvements, additions and betterments and construction work.

COST ELEMENTS IN RAILWAY OPERATION

Three principal elements must be considered to determine the cost of any service, operation, manufactured article or facility. These are direct material, direct labour and indirect costs. These include every expenditure necessary to turn out the finished product, viz., transportation.

Direct Stores: Direct stores charges are the cost of stores actually used in any operation or job including the incidental charges such as freight charges. Such costs are represented by the cost of timber actually used in rebuilding a passenger carriage.

Direct labour : The cost of labour directly assignable to the operation or job is known as direct labour charges. The pay of carpenters for the time actually spent in rebuilding the passenger carriage is an example of the direct labour charge.

The test for both direct labour and stores costs is whether the stores is used or the labour is consumed in actual operation or production process.

Indirect charges : Costs that are not directly assignable to the job come under the head of indirect costs. Shop and store expense are good illustrations of indirect costs in cost accounting for manufacturing products, as is also light and heat, power, water and repairs to machinery. The other cost items that are not directly assignable to any job are supervision; general administration taxes, rent, insurance and depreciation. In cost accounting however, provision must be made for including the proper preparation of such expenditures in every cost figure.

Accountants and Economists differ as to what items should be included in the cost figures of the various industries. But a wise rule would be to let the purpose or use to which the cost figures are to be put decide the issue.

The direct labour cost should only be included if the cost figures are used to gauge the efficiency of a gang or office force. If it is desired to control the total cost of a department or of a production process only those expenses for labour and stores over which the supervising officer has control should be considered. On the other hand, if the cost of performing a particular class of service is to be used as a factor in determining the rates and returns from that service; that is, in fixing the selling price, every possible cost factor, including rents, taxes, insurance and interest should be considered.

PRIMARY AND TOTAL COSTS

There are two cost figures that may be arrived at; primary cost and total costs. These may be represented by the following formulas :

Primary costs—Director stores plus direct labour.

Total costs—Primary costs plus indirect cost.

Each of these figures has its used in railway administration and regulation. In some cases only direct costs are used to guage operations; in other cases, a proportion of the indirect costs are apportioned according to a prescribed formula. In a few cases the totals of all the indirect costs consumed in any particular operation or service are apportioned.

The operating efficiency of a section gang is ascertained by measuring in terms of direct labour costs involved in inserting sleepers, changing rails, spreading ballast, etc. Here only the direct labour costs for each class of work is taken into consideration. To consider any indirect charge, other then the section foremen supervising the work would defeat the purpose of the cost study.

The same thing would apply in determining manufacturing costs at a railway workshop. It is not necessary to include every item of indirect costs for most administrative purposes and only such items as "shop expenses" that are closely related to the manufacturing process need be apportioned to the job because they are the only factors controlled by the Mechanical Officer in charge of the work.

It may be necessary to include every item of indirect cost under certain conditions, depending upon the purpose for which the cost figures are used. For instance in comparing a railway's cost of building a unit of equipment with similar costs of outside manufacturers in building similar units, the cost figures should include every item of cost that the manufacturer does, otherwise the comparisons would be of little value. If a railway eliminates its overhead and depreciation expenses from such cost figures and these are included by a manufacturer, the comparison would be erroneous.

RESULTS OF COST ACCOUNTING

The principal results of cost accounting are :—

1. Control of expenditure.
2. A basis for standardizing costs.
3. Elimination of waste & efficiency.
4. Comparison between individual lines.
5. A basis of rates.
6. An aid in formulating policies and solving problems.

Control of Expenditure : The primary factor in controlling expenditure is to know what a specific job, operation or service will cost before it is undertaken. For instance, if a railway finds it necessary to renew 50,000 sleepers yearly and it knows the cost of renewing 1 or 100 sleepers, the amount required to do the work can be easily ascertained. The amount will be known just as definitely before the work is undertaken as the cost of the sleepers quoted by the supplier or producer.

Also a knowledge of cost from day to day or from period to period after they have been incurred will help any railway officer to control his future expenditure. On some of the railways in U. S. A. a very close approximation of all transportation costs for the preceding day is known by the General Manager on the following day. This enables him to keep a close check of his operating costs and order the necessary revisions of practice or force to be made before unfavourable conditions develop.

COST STANDARDS

Cost accounting will gradually lead to cost standards while those standards will fluctuate with the fluctuations in the value of the rupee, and with the changing economic conditions, such as the introduction of labour-saving machines and improved methods, yet for purposes of comparison within a specified period standardised cost figures may be accepted and used. Deviation from such standards will be the first indication of results achieved for remedies required.

INDICATIONS OF WASTE AND INEFFICIENCY

Unit costs are the best indicators of waste and inefficiency and conversely, the best indicators of operating efficiency. If a Station Master handles goods at a cost of Rs. 3/- per ton and another Station Master working under similar conditions handles at Rs. 1—8—0 per ton, and if these figures are arrived at by the same formula and include the same cost factors, the relative efficiency of the two station forces can be readily gauged. Similarly, if one section gang can renew sleepers in road ballast at one third the cost of another, or one shop turn out a job at one-half of the cost of doing the same work at another shop, there can be no question of where the waste is located.

Comparison between railways: Uniform cost accounting also permits statistics to be prepared which will enable one railway to make an intelligent comparison of its operations and service with those of another.

AS A BASIS OF RATES

While specific rates have seldom been fixed with reference to the cost of service alone, yet this is an important and growing factor to be considered in rate making and should always be injected into any rate hearing. It is logical for the railway and the rates tribunal to want to know what classes of traffic create the largest profits and what classes are carried at a loss. No Railway has ever prepared an accurate cost statement reflecting the cost of any service or operation, from a purely technical accounting standpoint.

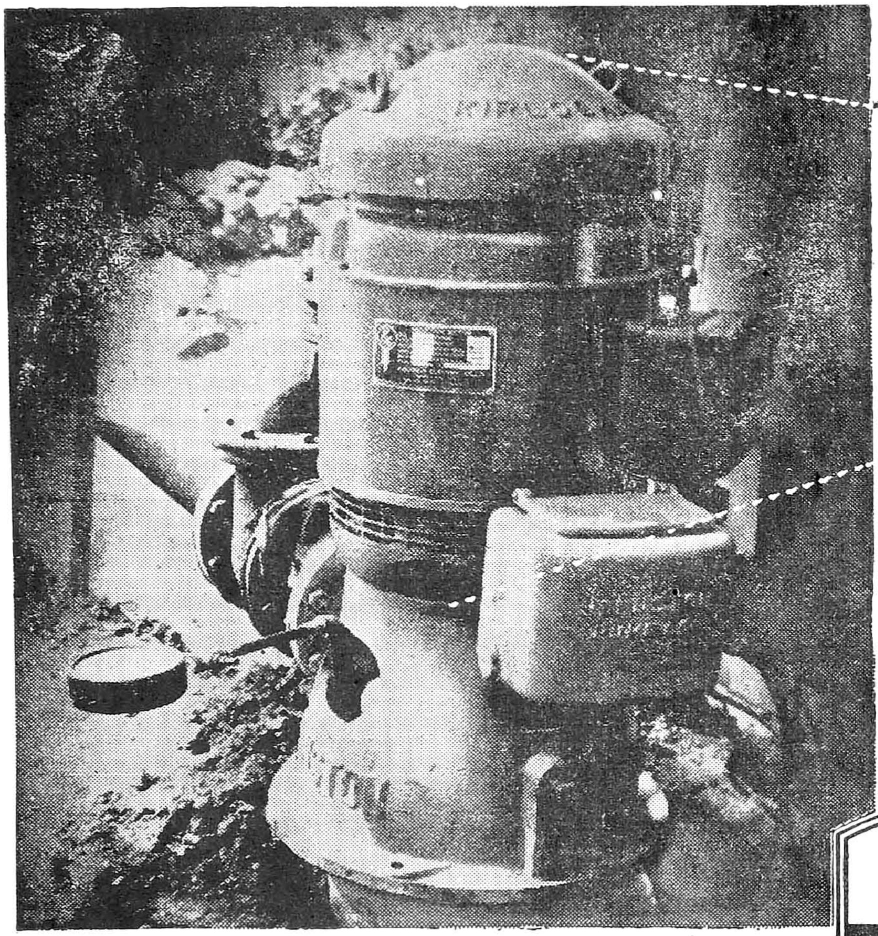
FORMULATING POLICIES

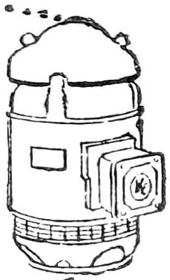
Cost figures are indispensable in formulating policies of management and solving problems that arise from time to time. In fact, without cost figures decisions are merely based on guesswork and partake of the form of gambling.

Instances of the use of such figures are legion, but the following case is important in that it shows not only the necessity for them but also the importance of considering every factor of costs.

A proposal was made to a railway to convert an electric traction route into a bus line. The accounting department prepared a cost statement, making a comparison of the costs of installing and operating the electric line and the bus line. The reaction of the President of the Railway to this statement brings out the point in question. He said :—

(Continued on page 25)





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BRUSH KIRLOSKAR

ELECTRIC MOTORS

Illustration shows a Brush/Kirloskar 15 H.P. 1500 R.P.M. vertical hollow shaft motor driving a Turbine Pump.

Under the Government tubewell Irrigation Programme, hundreds of Brush/Kirloskar vertical hollow shaft motors are driving turbine pumps for irrigation. They are built to Nema standards to ensure interchangeability on indigenous and foreign pumps.

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GRANT

FIAT RAILCARS

THE Fiat Company of Turin (Italy), famous the world over for its motor cars, of both utility and high quality types, manufactures also many other mechanical products: commercial vehicles, tractors, aeroplanes, aviation engines (including turbojets), railway and tramway rolling stock, marine and stationary diesel engines, machine tools, domestic electrical appliances (refrigerators and washing machines), besides castings, forgings, stampings and lubricants.

Fiat has been building railway rolling stock, notably motor railcars, since 1931 and was the first firm in Italy to design this modern form of rail transport and build it on a production basis.

The forerunner of the modern Fiat railcar was a small open type petrol driven tram, which carried people on a narrow gauge track around the grounds of the Milan International Exhibition of 1906. Travellers on this early example of a motor driven railway vehicle certainly did not taste the joys of high speed, but were subjected to frequent and harmless derailments and often had to lend a hand to put the car back on the track. Both car and rails ended their days in India, having been bought by a wealthy Rajah for the amusement of his household and his guests.

It is a far cry from that primitive vehicle to the luxury train built by fiat for the Egyptian State Railways, originally for the use of the then Royal Family. This fine train consists of two close-coupled intercommunicating cars. The overall length of the train is 152′ 6″; it is built entirely of steel and weighs 114 tons. Power is supplied by two SBD–OM Saurer diesel engines, each with 12 horizontal cylinders (2 opposed banks of six) giving a total of 480 hp. at 1400 rpm. Maximum speed 75 m. p. h.

The outside of this train (which is the only one of its kind in existence) is finished in aluminium colour, which gives the impression, when the train is travelling at speed, of a flash of silvery light.

This Egyptian train is lit by fluorescent lighting, is air conditioned and has a complete automatic 16 line (2 external, 14 internal) telephone exchange and a radio sending and receiving set.

The equipment, furnishing and decoration of this train are most complete and luxurious; every detail is of Italian design and workmanship.

Fiat's international reputation in railway engineering won them this very important order. Other modern types of railcars have been supplied by Fiat to the Italian State Railways, as well as to the railways of Greece, Spain, and other countries.

Twenty 3-car train sets (two railcars and a trailer in the middle) have been supplied to the Spanish National Railway System (RENFE). Each of the power cars in these trains has a 480 hp., 12-cylinder horizontal diesel engine, installed under the floor. Of the 2 bogies, one carries the engines while the other is a plain bogie. These trains are 273 feet long overall and have seating accommodation for 174 passengers. The maximum speeds is 75 m. p. h. on a gradient of 7‰ (seven per thousand). The train can be divided as there is a driving compartment at each end of the two railcars.

Three similar train sets have also been supplied by Fiat to the Portuguese (CP) railways.

For the Greek Railways Fiat has supplied 16 railcars and 8 trailers. Each car is 78′ 9″ long and seats 85 passengers. Two railcars and one trailer coupled together make up a train 236 feet long, with accommodation for 273 passengers. The seats are comfortable and the corridors wide. The windows afford a good view of the scenery; the cars are heated in winter and have every modern convenience, including a bar.

Fiat's Railway Rolling Stock Division, well and modernly equipped, was of great help in reconstructing Italy's railway rolling stock depleted during the war. Since 1945 149 damaged or burnt out railcars and 3 semi-destroyed motor trains have been rebuilt.

Up to 1939 Fiat had built 134 petrol driven railcars and 518 diesel powered cars, 3 experimental types were completed during the war and over 100 new railcars were built, besides about 40 trailers. Further, over 200 six-cylinder type 700 railcar diesel engines have been supplied to various buyers in Italy, Greece and Australia.

(Continued from page 23)

"I looked down the calculations to find that apparently there would be a distinct saving by making the change, abandoning and salvaging the lines, to put into line the automobiles. However I found that when the automobile was bought and put into service, it would run for ever apparently, it was assumed (from anything on the page) the money to pay for it could be had simply for the asking, as if there were no other use for it, consequently it would draw no interest. And as for insurance, why automobiles neither blow up, nor burn, so why insure? Thus, the deductions were wrong just because of those simple omissions of depreciation, interest and insurance. I returned it with the suggestion that when attention had not been devoted to those important items, it probably would be well to begin at the beginning with all the other calculations."

STEEL SLEEPERS

Some Notes on their use and Method of Manufacture

BY SATYENDRA KUMAR

TODAY more than ever the Indian Railways are on the threshold of a new and vast rejuvenation. The increase in tonnages that have to be handled over the length and breadth of the country are immense. Steel, coal, cement and food alone represent an increase of 54 million tons by the end of the Second Five Year Plan. This new responsibility of the Railways is going to entail extensive relaying of track and perhaps this is not an inopportune moment to pause and give thought to the sleepers on which the rails are carried. The stone blocks on which the first railway lines were laid gave way soon after to wood which was found to be a far more convenient material for the rapid relaying of Railway Track. Conditions of climate, soil and insect attack in certain parts of the world made it essential that some more durable material should be used in place of wood and the steel sleeper was born.

The steel sleeper, however, exhibited superior qualities of its own and soon came to be recognised, especially in tropical, semi-tropical and even temperate climates as not only a substitute for wood, but as a product that in its own rights was worthy of carrying the Railways of the world on its back.

A recent survey of Railways in Algeria, Belgian Congo, Cameroons, Ethiopia, Greece, Madagascar, Morocco, Switzerland, Tunis and West Africa, in length totalling 11,600 miles, show that Steel Sleepers are used 90—100% in the track, while the Railways in Australia, Benguela, Ceylon, East Africa, Egypt, Gold Coast, India, Iran, Iraq, Kenya, Nigeria, Pakistan, Rhodesia and South Africa, have absorbed over half a million tons of Steel Sleepers from British Makers in the decade since 1945. All these Railways confirm that Steel Sleepers give excellent service, their lives being given as 40, 50 and 60 years and, what is perhaps equally important, when Steel Sleepers are recovered from lifted track they are reported to be capable of re-use in between 80—100% cases.

From all the information available on Steel Sleepers the following facts have emerged.

LIFE

While local conditions may vary, Steel Sleepers invariably last longer than wooden ones. In areas where corrosion is particularly heavy, small additions of alloying elements raise the resistance of the steel against saline attack for instance. It is also of vital importance that a higher percentage of sleepers made of steel can be recovered and used for relaying on secondary lines. Steel Sleepers are better able to withstand removal and relaying, and their average additional life is longer.

COST

When determining the relative cost of the two types, the Steel Sleeper must be compared with the wood sleeper in its ready-for-use condition, that is after creosoting (where this is done) and after any necessary holes have been bored and surfaces adzed. Even if there is then a small advantage in favour of wood this will be more than offset by the increased life of the steel type.

PERFORMANCE

There is little to choose between the quality of track supported by steel or wood sleepers. Steel Sleepers are more uniform both in size and material and this has an effect on vehicle riding characteristics. Wood sleepers have a better capacity for absorbing rail joint shocks, but this may be nullified by the tendency to cause more rolling of the vehicles due to lack of track rigidity.

Steel Sleepers are supplied with fastening holes in position, so that it is only necessary to assemble the track, the gauge being pre-determined. This feature is of particular advantage on sharp curves as the gauge is more accurately maintained, the allowance for widening on curves being made by use of different sizes of fastening clips. The alignment is better since the end of the sleepers dig into the ballast and offer considerably more resistance to movement than do the wood type. They are rigid and strong and do not suffer from deformations if the ballasting pressures vary. They are absorbent of shock and do not break up under derailments.

Steel Sleepers ave obvious advantages when used in running in shed tracks and at points where engines are liable to stand for any length of time.

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Noise is not necessarily a nuisance with Steel Sleepers, but other factors such as the general conditions of the track are generally responsible for any excessive noisy running.

TRANSPORT AND STACKING

Steel Sleepers can be stocked in approximately one third of the space occupied by the corresponding wood Sleepers. This has obvious advantages in permanent way yards and during relaying operations.

ULTIMATE DISPOSAL

Both Steel and Wood Sleepers can be adapted for other railway purposes, but the scrap value of steel sleepers, when they have finished their useful life in track, is higher than that of wood.

Recently the Workington Iron & Steel Company, of Cumberland, Branch of The United Steel Companies Limited, of Sheffield, has undertaken to supply the Director General of Supplies & Disposals, New Delhi, with 26,000 tons of Steel Sleepers for use with 50 lb. and 60 lb. per yard Rails in metre gauge track for the Indian Railways. A portion of this tonnage is destined for use in the Southern Railways and part of the order has already been shipped to the port of Madras. This article would not be complete without some information on the manufacture of these sleepers that are finding their way into the tracks of the Southern Railways.

The Workington Iron & Steel Company is located on the North West Coast of England with a Dock of its own, The local hematite iron ores from Cumberland are supplemented with similar high grade ores from Norway. Sweden, Spain and North Africa. It is interesting to record that the Company worked Manganese Ore Mines in Mysore from 1905—1931, and that Manganese Ore is still imported from India for use in the production of Ferro-Manganese.

From these high grade hematite ores, hematite iron is produced in the Company's own Blast Furnace Plant and is carried molten to the Steelworks where it is converted by the Acid Bessemer Steel making process to Acid Bessemer Steel which is eminently suitable for rails and other railway material. This steel, cast into ingots, is taken while still red hot into the Rolling Mill and there rolled down into the final section required whether it be Rail, Sleeper Plate, Bloom or Billet.

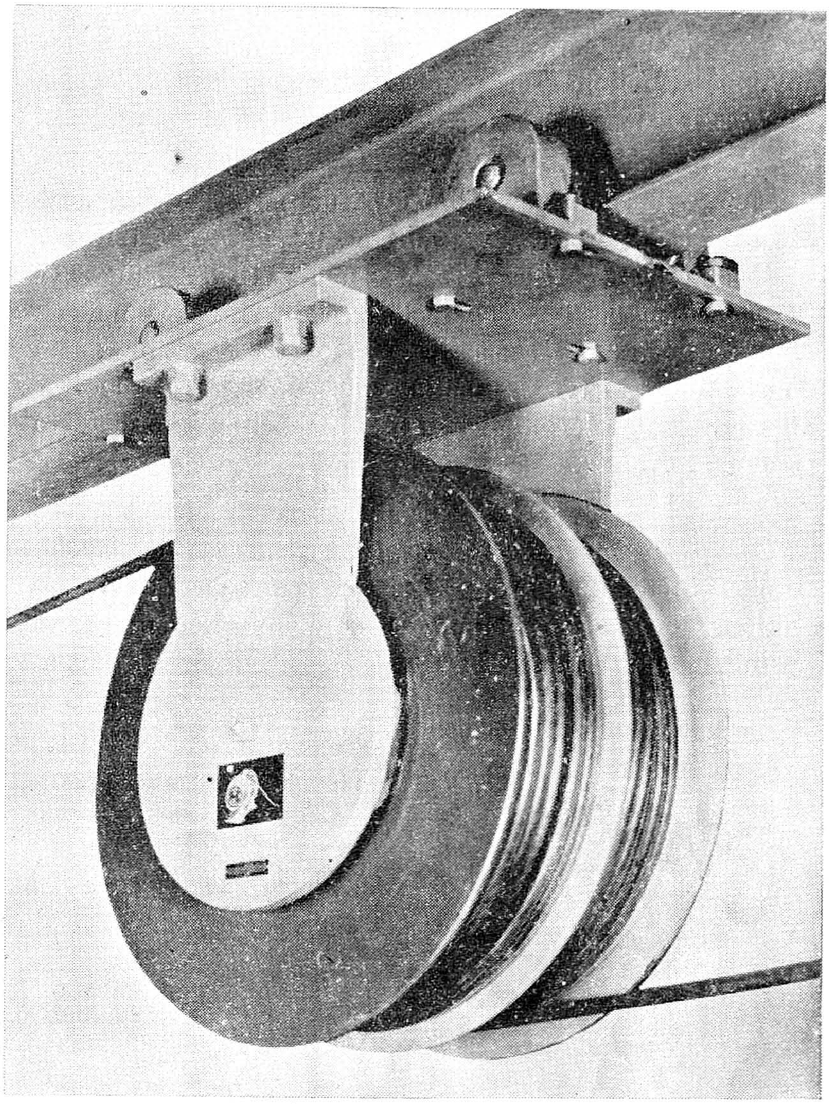
The raw material for the steel sleeper is the flat, or trough shaped sleeper plate, produced in the Rolling Mill and, after these plates are cooled, they are transferred to the Sleeper Press where they are inspected for defects and then cold sheared to the correct finished length. The sleeper plates then pass through a walking beam furnace, fired with low pressure coke oven gas, where they are heated to a temperature of 850—900° C. The plates are next skidded under a hydraulically operated punching machine where the holes for the rail fastenings are hot punched. It is clearly important that if the necessary accuracy is to be attained, the plates should be punched at the correct pre-determined temperature. The next operation is the pressing of the plates to the required shape under a hydraulically operated press. The sleepers now properly shaped pass along an open air gantry where they are allowed to cool to a pre-determined temperature and any scale is brushed off by wire brushes. The absence of scale and the temperature control are to ensure that the subsequent coating is done effectively. An electric skid then pulls the sleepers, while still warm, into a tank containing a mixture of creosote and tar oil at a temperature of approximately 300° C.—this mixture has proved particularly effective in resisting corrosion. On completion of dipping, the sleepers are slowly lifted out of the tank on an endless conveyor. It should be remembered that right from the time the flats were cold sheared to now the sleepers have had to move along the production route without a stop because the control of temperature at each stage has been of vital importance. When the sleepers have cooled down the inspectors check and gauge them all. One sample set of sleepers from every shift is assembled to form a length of track whose gauge and tilt are very carefully checked. Thus, in one Works, the production of steel sleepers is covered from the iron ore to the steel, from the steel ingots to the finished sleepers and, at every stage, production is carefully inspected. It is quite obvious that, but for the good quality of steel and its proper protection, and the meticulous care in maintaining high standard of accuracy of manufacture, the advantages mentioned in the preceding discussion of the use of steel sleepers would not be obtained.

Interesting Applications of Modern Electric Cable Reels for Railway Work

INTERESTING to railway engineers are the 'Wayne' self-winding electric cable reels, which are now being employed for varying industrial purposes.

Among the nine standard ranges manufactured by Power House Components Ltd. of King Street, Nottingham, England, under the directorship of David Rushworth, and carrying the registered trade mark 'P. H. C' is the 'Wayne' Patent Super 22/4/4 Trailer reel, which is a specialised and particularly robust application developed for use in railway goods yards, docks and harbours and for out-of-door operations generally, where bad operating conditions or large quantities of fine dust in the atmosphere may be present.

The 'Wayne' Trailer reel is essentially a double type which pays out two lines of cable in opposite directions so that the reel can be placed in the centre of the work and double the amount of cable handled because the pay-out is in two directions at once, whilst current carrying slip rings are eliminated. The Trailer reel positions itself at points midway between the static electrical connection and the equipment being served, such as for example, a crane or electric hoist, but it must move along the R. S. J which carries the hoist, or otherwise the cable attached to the supply point would sag as it is paid off the drum.



"Wayne" Patent Trailer type Reel.

An important feature is that the rubber cable is not broken between the point of contact with the machine being supplied with current and at the other end of the cable, where it is connected to the electric supply point.

Another interesting example from the standard range is the 'Mammoth' which takes the largest cable made ($2\frac{1}{2}''$—$3''$ in diameter) and which can be used for excavators and tunnelling machines.

The field of application for these "Wayne" reels is continually being enlarged, which is not surprising in view of their efficiency and economical operation in addition to neat appearance, and simplicity of design and construction.

LOCOMOTIVE ERECTION AND NEW COACH-BUILDING PROGRAMME

The first two new W. P. Broad Gauge Steam Locomotives out of a total of 30 to be erected by the Central Railway's Locomotive Workshops at Parel have been received in a knocked-down condition. These powerful stream-lined locomotives are utilised for hauling Mail, Express and Passenger trains on the Broad Gauge. The first three have been allotted to the Western Railway and the remaining 27 will be put into service on the Central Railway. This instalment of 30 locomotives forms part of 120 such locomotives being built in Canada for the Indian Railways under the Colombo Plan.

STEAM LOCOMOTIVES BUILT IN HUNGARY

EXPERTS in all corners of the world are becoming more and more acquainted with Hungarian-built locomotives. This is due to the fact that the MAVAG Locomotive and Engineering Factory has been joining invitations for tenders abroad with increasing success for decades.

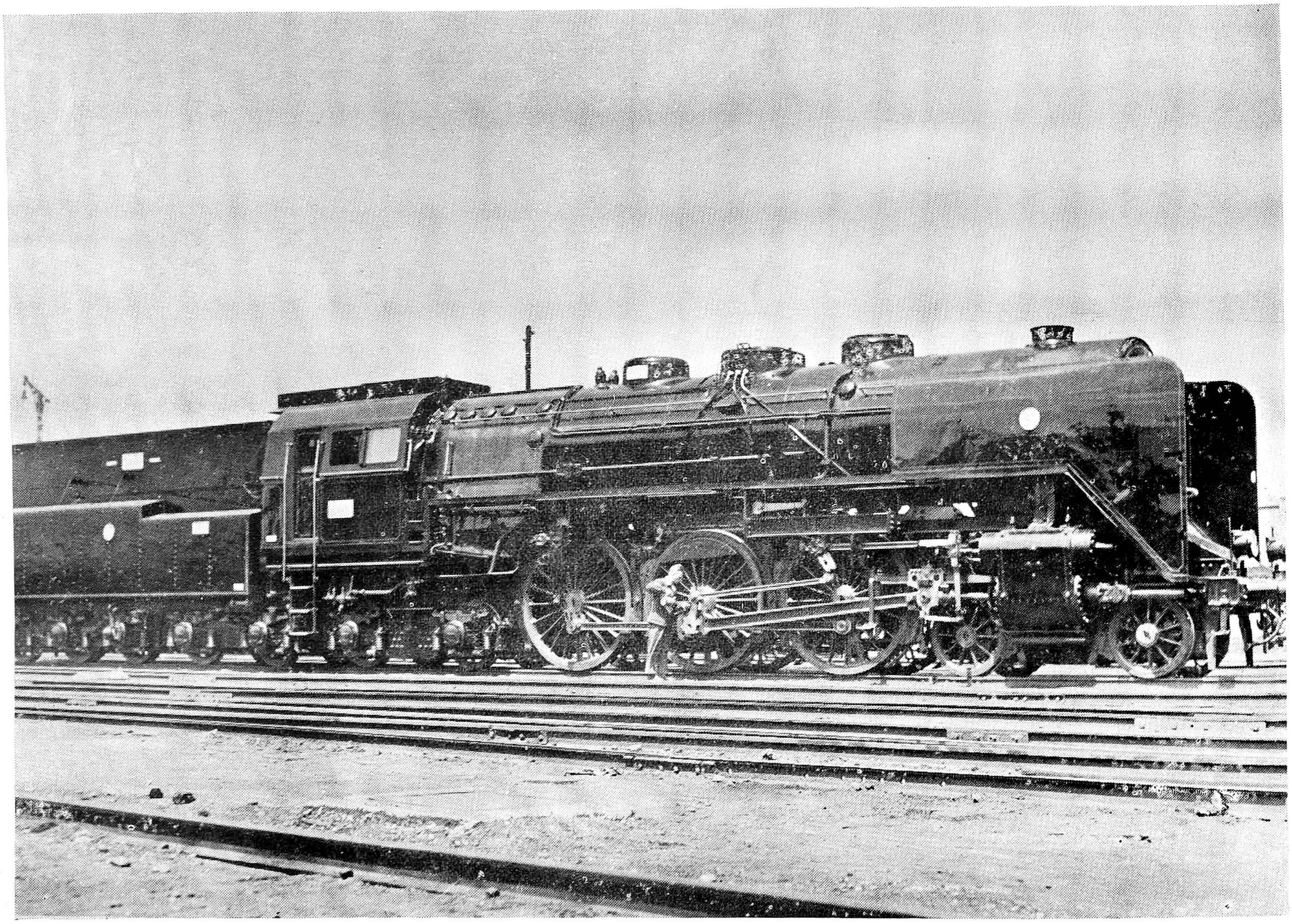
Due to its rapid development, Hungarian heavy industry can meet both home requirements and foreign orders in locomotives. The present standard of Hungarian industry can be best characterized by its locomotives built in small and large series. Prior to describing the more important types, mention must be made of the fact that Hungarian locomotives are also being supplied to countries oversea.

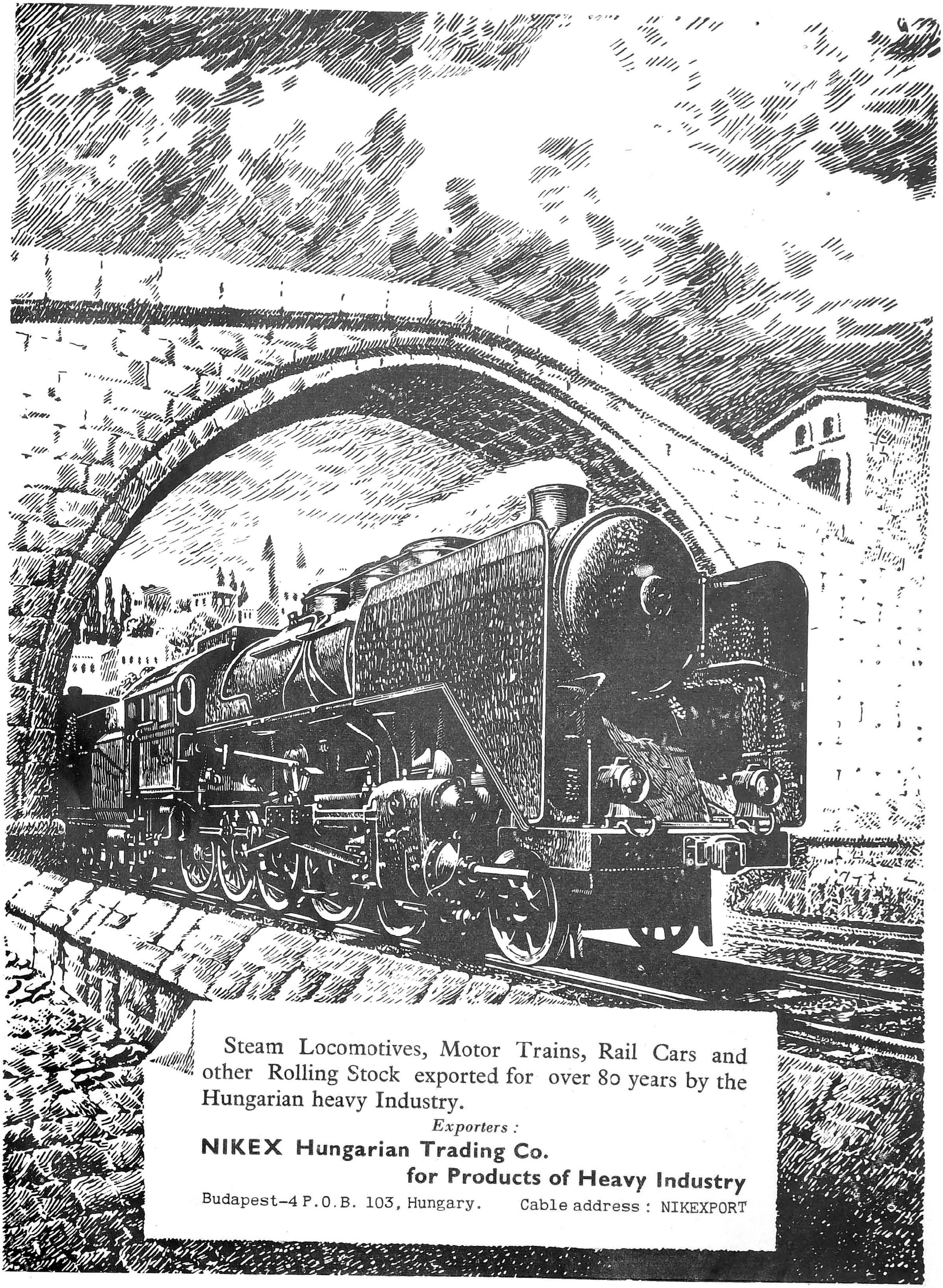
One of the most recent overseas orders was that by the Indian State Railways which covered more than 500 various locomotive boilers, a great number of steam cylinders and pairs of wheels.

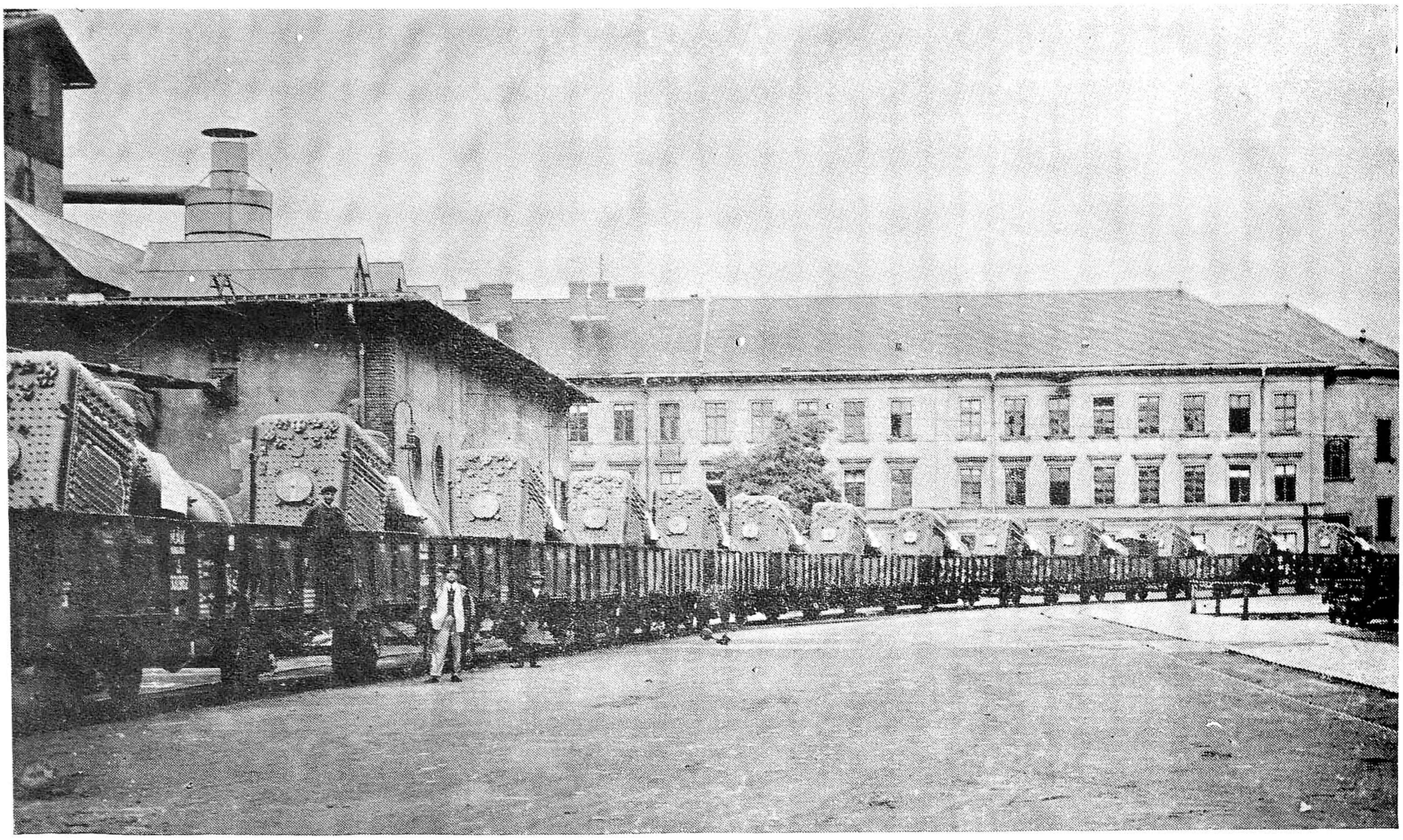
The standard 424 series 4—8—0 tender locomotive of the Hungarian State Railways is being built in great numbers. This locomotive being supplied to the Far East and provided with central buffing and drawing gear. The first units of this type were built many years ago but the modern locomotive, meeting all requirements of railway technique was developed by improvements in design and by the standardization of parts made during the last few years.

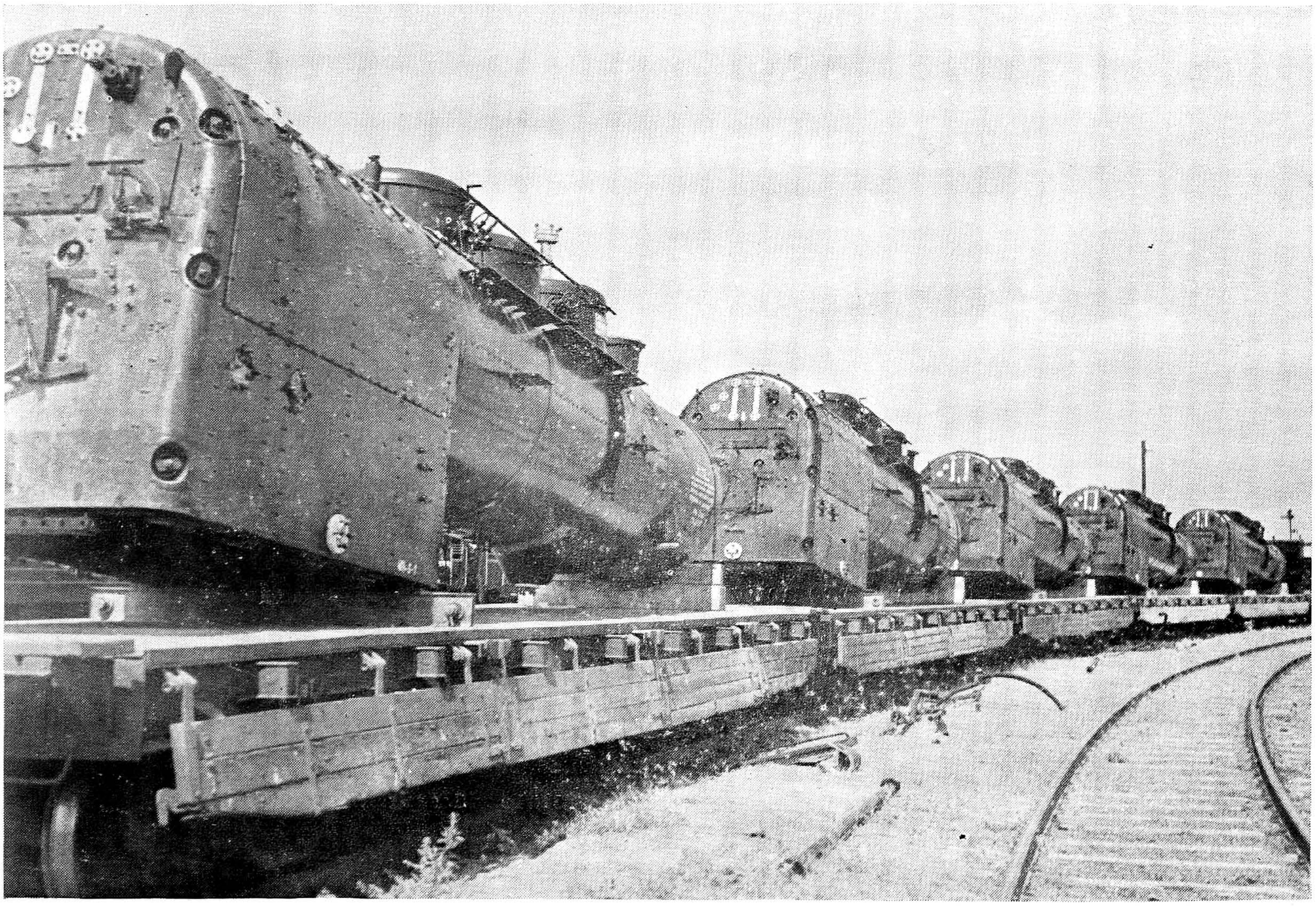
Due to its recent design this locomotive meets the most up-to-date requirements and constantly increasing outputs at a high rate of economy. This type can be considered to be of universal use since it pulls medium-heavy long-distance passenger trains at 90 kmph as well as medium-speed and weight fast trains and fast freight trains.

The locomotive has become very popular in both Hungary and abroad and is a standard type of the




Steam Locomotives, Motor Trains, Rail Cars and other Rolling Stock exported for over 80 years by the Hungarian heavy Industry.
Exporters :
NIKEX Hungarian Trading Co.
for Products of Heavy Industry
Budapest-4 P.O.B. 103, Hungary. Cable address : NIKEXPORT





Hungarian State Railways. A great number of units are under construction.

The new express steam locomotives, built for the Hungarian State Railways are another characteristic type of Hungarian-built locomotives. The locomotives has a relatively short rigid axle distance of 4500 mm. and an advantageously high, 10. 6 m. guided length so that it smoothly at its runs maximum permissible speed of 100 kmph. An interesting feature is that the axle load of the 2 m. dia driving wheels may be set to either 16. 5 or 18 tonnes to suit road conditions.

The broad firebox is arranged above the firebox and is drawn backwards. Grate area is 5. 5 sq. m. Since a fireman could not supply the grate with an adequate quantity of coal, an automatic stoker has been applied.

The two cylinders with twin arrangement are fitted with Heusinger-Walschaert internal admission valve gear.

The ten wheels of the tender and the free wheels of the locomotive are supplied with MAVAG "ISOTHERMOS" axleboxes. The tender has a capacity of 23 cu. m. of water and 13 tonnes of coal to suit the 18 kg. per sq. cm. pressure boiler having an evaporating surface of 240 sq. m. Rated tractive effort /o. 6 p/ is 11. 500 kg.

The exterior of the locomotive with its smoke deflector plates applied at the front fully satisfy up-to-date aesthetic requirements. The approx. 2500 indicated HP. machine is one of the most modern locomotives of the Hungarian State Railways.

Besides locomotives of its own design and constructed for the Hungarian State Railways, Hungarian industry is also building locomotives for customers abroad. A great number of machines is being exported to the Soviet Union. One of these is the Series ER 0—10—0 freight locomotive of which the 1100th unit has recently left the factory.

Its Belpaire-type firebox is characterized by staybars attached through welding instead of stay-bolts. Except the transverse riveted seams, the boiler is welded throughout. The butt-welded seams are X-ray tested. Trial and acceptance tests are conducted over a special track of the factory.

In addition to building standard gauge locomotives in large series, a narrow-gauge tender steam locomotive with 8 coupled wheels is also being constructed in series. Approx. 200 units have so far been delivered for domestic and export requirements.

These locomotives have also been constructed according to customer's specifications. The Belpaire firebox is riveted. The inner firebox is a welded steel structure provided with a Nicholson thermic syphon. The running gear features manganese steel-lined journal bearings and journal box guides. Journals are provided with Ajax grease lubrication.

These locomotives have been transported from Budapest to the port of Trieste through Austria and Italy by rail.

Hungarian industry has been building locomotives for 85 years and the world-famous MAVAG Locomotive and Engineering Factory is now producing one locomotive a day.

It is hoped that this short survey will be instrumental in furthering connection with the railway companies of far distant countries and will procure new friends for the Hungarian locomotive building industry.

BICC INSTITUTE A TRAVELLING SCHOLARSHIP

British Insulated Callender's Cables Ltd. have instituted a Travelling Scholarship as a tribute to Sir Alexander Roger, K. C. I. E., for many years Chairman of the company and now its first Honorary President. It will be known as the Sir Alexander Roger Travelling Scholarship.

With a value up to £ 1,000 in addition to normal emoluments, it will be awarded annually to an employee of BICC or of one of the various companies of the BICC Group and will enable a young man or woman of ability to travel overseas for study, training and general education for a period of not more than twelve months.

The decision to make the scholarship a travelling one has been taken in view not only of Sir Alexander Roger's expressed faith in the younger generation but also his broad world-wide outlook on industry and commerce.

AXLE COUNTERS FOR RAILWAY SIGNALLING

By D. W. Chilian *

MANY new methods have been introduced to Railway Signalling within the recent years. Colour light signalling and track circuits are applied extensively to increase the capacity of heavy traffic sections in order to speed up signal operation and at the same time to obtain a higher security by an absolute indication of the occupation of the track section.

Since track circuiting stipulates the provision of wooden sleepers, this method has been found rather costly where only iron sleepers are provided, and their replacement involves a considerable amount of reconstruction. A new method has, therefore, been adopted for iron sleepers on the Continent, which is commonly known as Axle Counters.

Axle Counters constitute the same safety principle as track circuits, i. e. they indicate absolutely the occupation of a certain track section by a train or other rail-bound vehicle. Also the fail-safe principle has been preserved which means that in case of any failure by the apparatus "danger" indication will be given or in other words "section occupied" will be indicated.

Axle Counters of the type described in the following have been developed by SIEMENS & HALSKE, Germany, who are the leading manufacturers of modern signalling equipment on the Continent.

PRINCIPLE OF OPERATION

By magnetic track devices—which are mounted both at the entrance and the exit of the track section concerned—electric impulses are transmitted to a counting apparatus which registers and compares the number of axles that have entered the section with the number that have passed out. When both numbers coincide the apparatus will indicate "line clear" in the same manner as does a track relay when energised. "In" and "out" movements of the same axles over one track device only are possible when arranged for by a certain circuit arrangement and adjustment of the track devices. Where only very short track sections are controlled, it may be possible that a long train may already clear the section with its first axles while its tail axles may still enter the section. All this has been taken into account and will be properly registered by the counting apparatus which is being released once the section is completely cleared.

MAGNETIC TRACK DEVICES

The track devices, which operate on a purely magnetic principle, act as rail contacts. They are installed at the inside of the rail according to Fig. 1 which shows their

Fig. 1. Adjustment of Track Devices at the Track

* *Railway Signalling Engineer of M/s. Siemens & Halske in India.*

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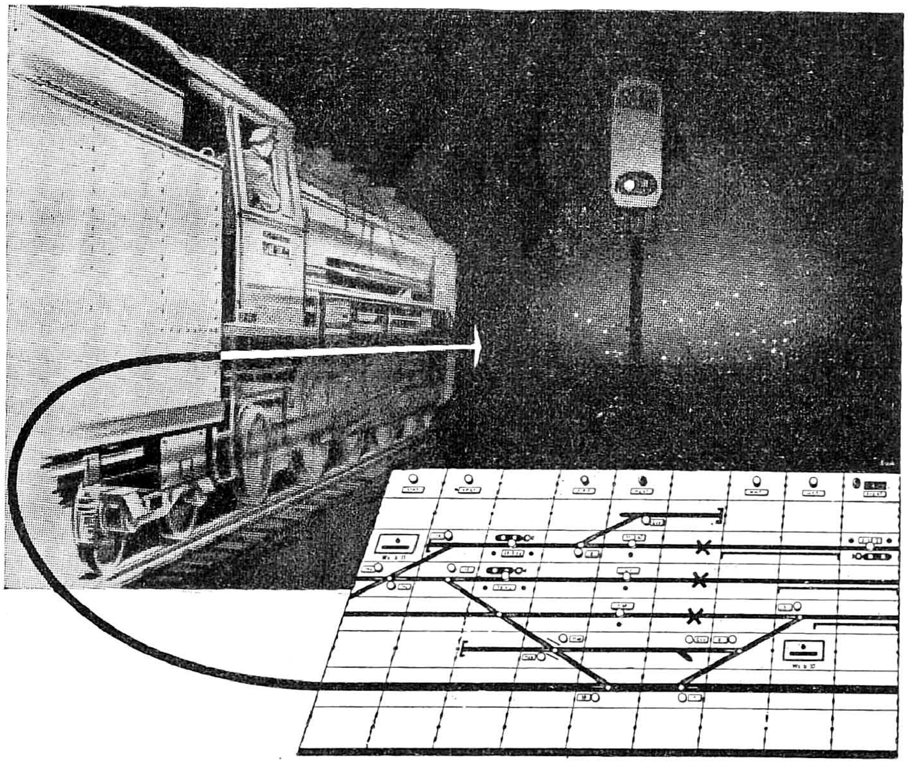

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adjustment by a special gauge. The latest design does not require any space above rail head and provide ample clearance for the passing wheels. A polarized relay armature is incorporated in the device which is influenced by a permanent magnetic field.

When a wheel flange is passing through this magnetic field, the magnetic flux is partly absorbed by the wheel thereby causing a deflection of the armature from its normal position. A contact is attached to the armature which follows its movement, thus making and breaking the circuit of the counting apparatus. The magnetic flux is generated by strong permanent magnets and does not require any generating power.

The magnetic field deflection is also caused by a standing wheel, i. e. the track device controls the entire speed range of the passing axles, from highest speed upto zero.

Fig. 2 shows the flux distribution when not affected by a wheel flange. A strong magnetic main flux is passing

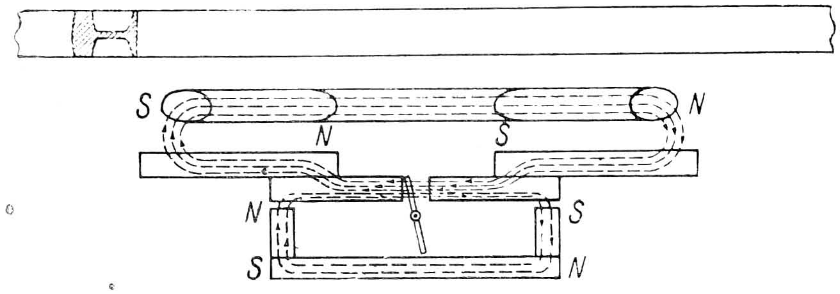

Fig. 2

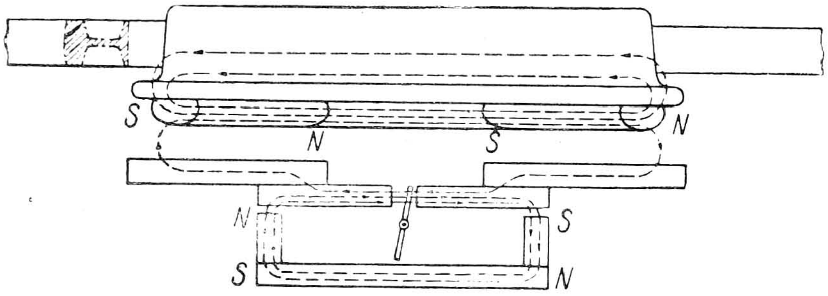

Fig. 3

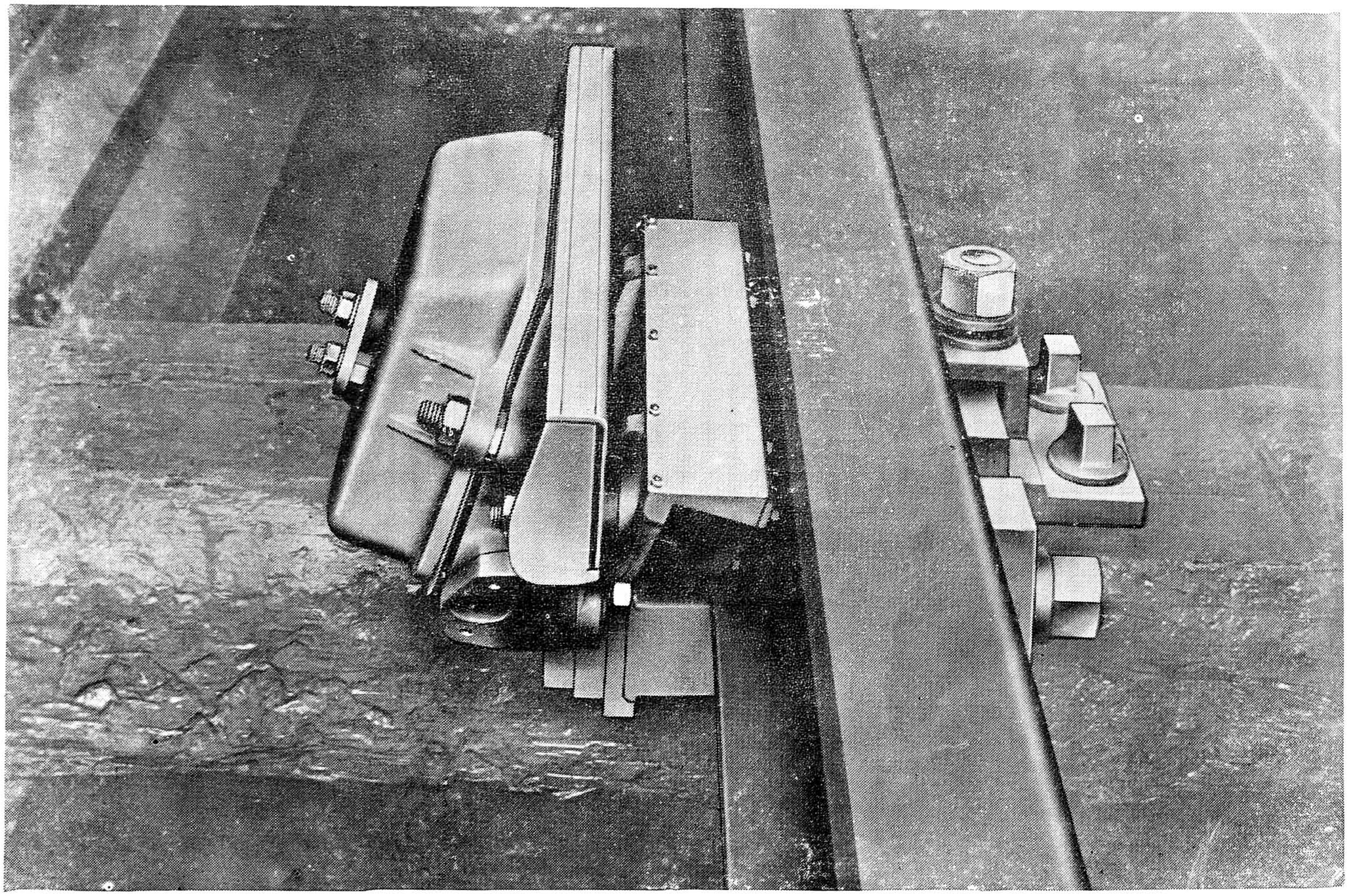

Fig. 4. Magnetic Track Device

in India's life and every moving part of it...

The staff of Burmah-Shell's Technical Service are all well-trained and experienced engineers. They know their job, and they've helped many harassed factory managers sort out their lubrication problems. After surveying the plant, they give the operators a specially prepared lubrication guide which shows clearly the type and grade of lubricant needed for each application. Then, in many cases, they can recommend a reduction in the number of different grades used and so cut down your costs. Finally, you can rest assured that if there is a problem that has everybody baffled, our people will call in the Technical Department of the Shell Petroleum Company. They are in constant touch with manufacturers all over the world, and have highly-trained chemists working in research laboratories in England, the U.S.A. and on the Continent. And they won't stop until they've found an answer to your lubrication problem.

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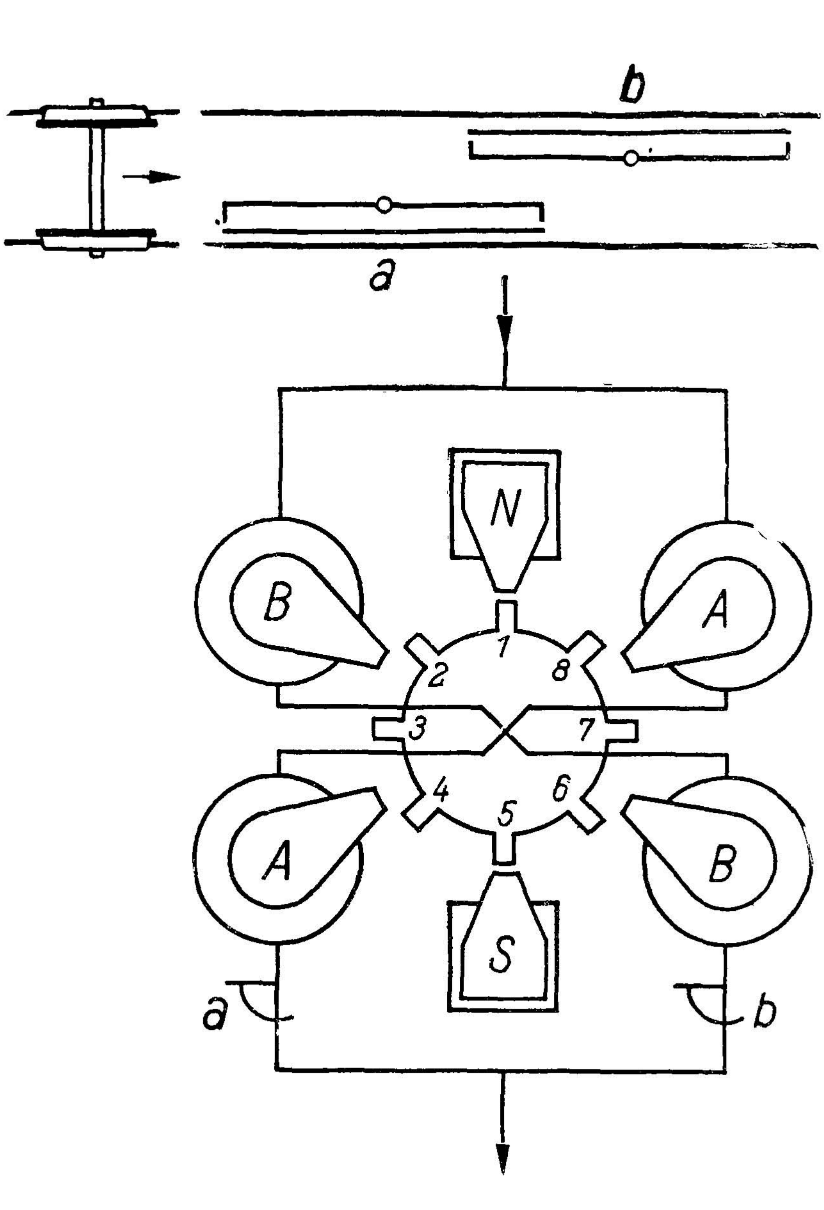


Fig. 5

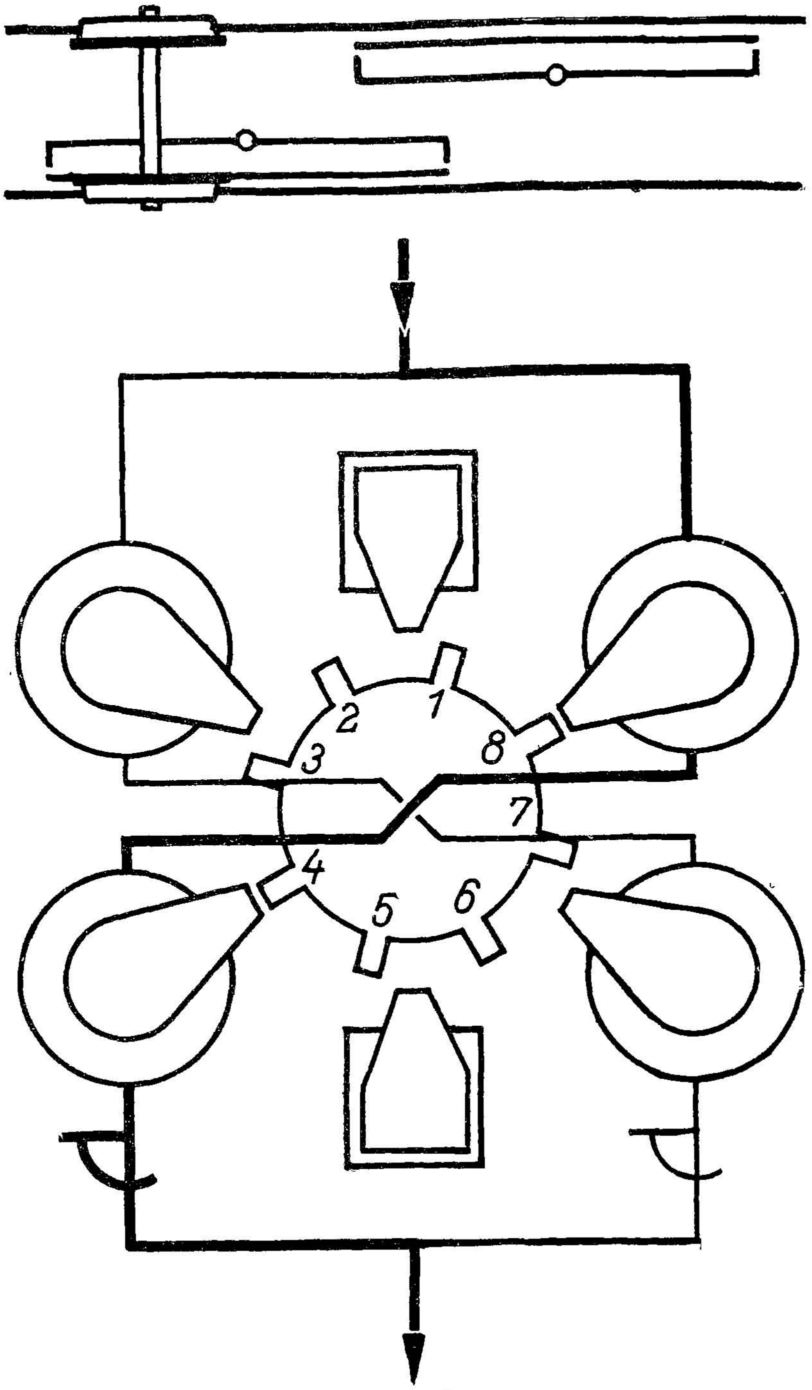


Fig. 6

from a magnetic north-pole through an iron yoke, in the air gap of which a polarized armature is fixed. Another secondary flux passes through the iron yoke in opposite direction. The position of the armature depends upon which flux is the stronger.

When now a wheel is passing over the track device, as shown in Fig. 3, the main flux is weakened by partly absorption from the wheel flange and the armature will move in opposite direction, as long as the wheel passes over it. This movement of the armature will operate a contact which is making and breaking circuits thus controlling the counting apparatus.

A magnetic track device as fixed to the rail is shown on Fig. 4.

COUNTING APPARATUS

Different methods have been adopted to count the electric impulses of the track devices. Only one type of apparatus shall be described here which is the motor-type counter mechanism. It is composed of a cog rotor and six field magnets, two of which are permanent magnets, the other four being equipped with coil windings for excitation. The method of operation can be explained best by following up the Fig. 5 to 8.

Fig. 5 shows the apparatus in normal position, the cog rotor being held in its position by the permanent poles N and S. At the counting site two track devices are installed which are mounted on the opposite rails, lengthwise displaced. Their contacts a and b are connected in series with the field coils A resp. B.

In Fig. 6 an axle is intercepting the first track device which operates its contact a thus energising the field

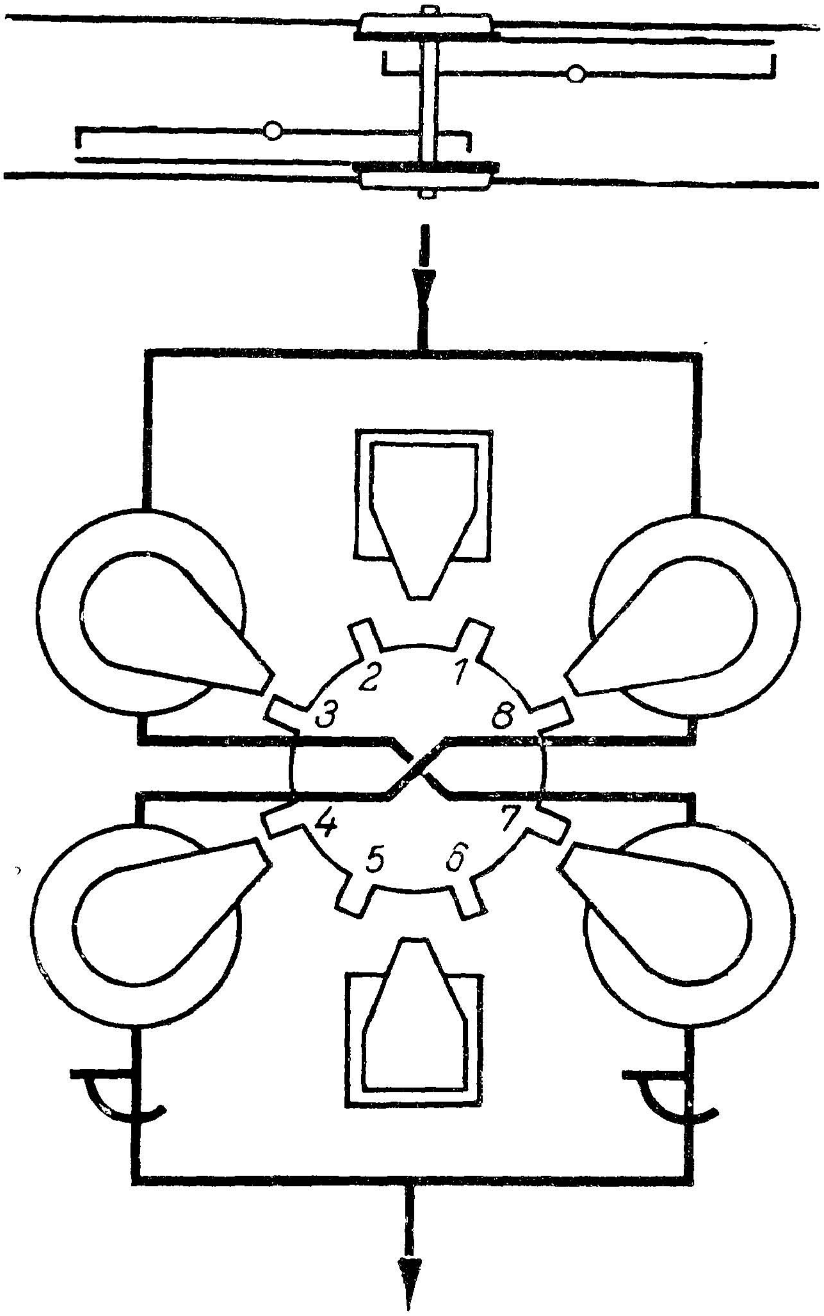


Fig. 7

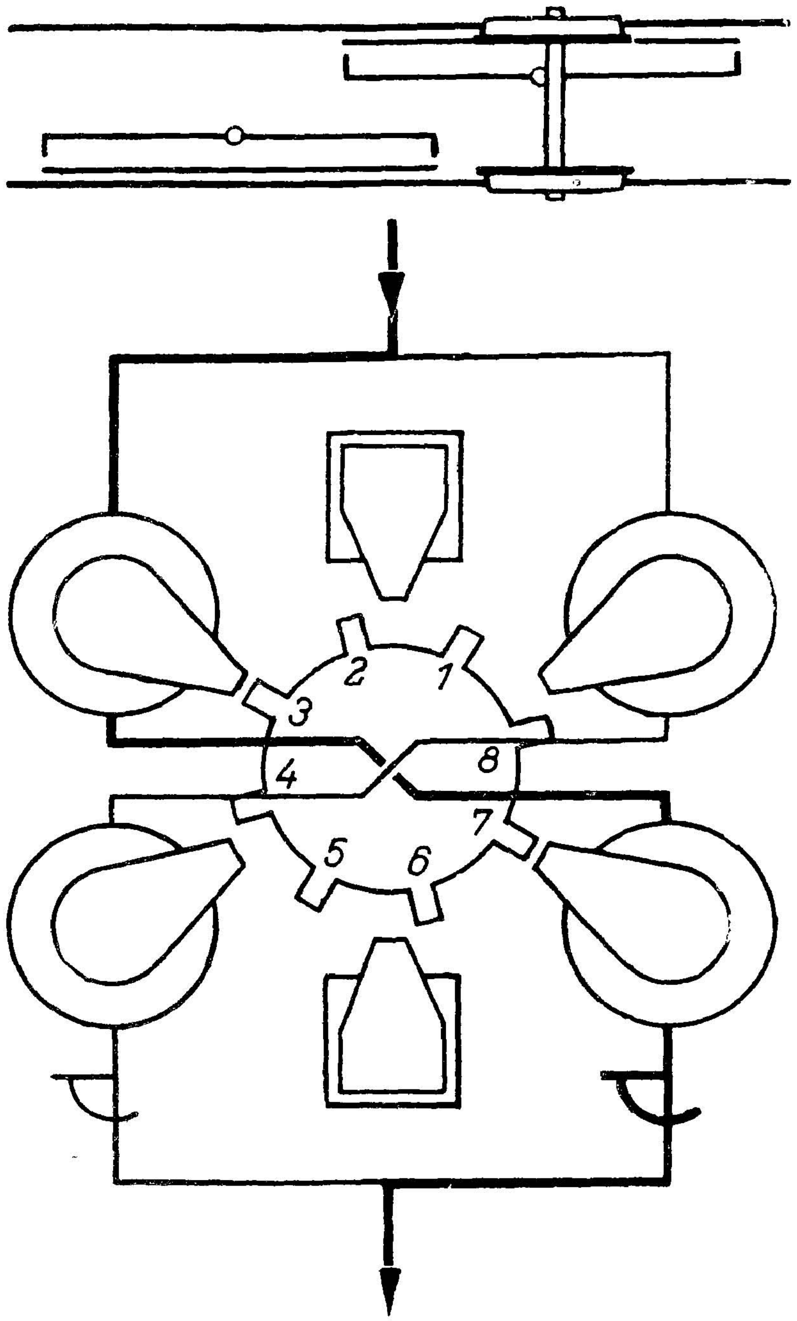


Fig. 8

coils A. The path of current is indicated by heavy lines. By excitation of the field coils the cog rotor is displaced from its normal position.

Fig. 7 shows that through interception of the second track device and operation of contact b the cog rotor is moved further by the excitation of coils B.

At Fig. 8 the first track device is released again which brings about another rotation of the cog rotor. After the release of the second track device, the rotor will have turned thus that its cogs 2 & 6 are opposite the permanent poles N and S.

Depending on the order of the impulses received by the coils A or B, a left or right movement of the rotor is effected. Thus the counting is direction sensitive. The cog rotor itself is coupled mechanically with a counting mechanism which will indicate upto 499 axles. By another pair of track devices at the end of the section, a second counting apparatus will be controlled. Both counter works are coupled mechanically by a differential gear arrangement which is resetting the counting mechanism everytime an axle is counted "out".

The "line clear" contact will only close, when the counting mechanism indicates "zero". Besides that, another contact is provided which will close after the first axle has been counted "in" and it will remain closed until "zero" position is obtained. Thereby a relay is

controlled which checks the resetting of the counting circuit after all axles have been counted "out".

ADDITIONAL CIRCUITS

The axle ,counter apparatus is the first operating element for a number of relays which are required for the control of signals etc. in an interlocking system. These relays are provided with an appropriate number of contacts to operate secondary relays, indications, releases etc. similar as a track relay. All these addit onal relays are housed, together with the counting apparatus, within a small apparatus case, easily to be installed in the cabin. Direct current of 24 or 60 volts is required for the operation of the apparatus.

It may still be mentioned that in case of failure of the system always " line occupied " will be indicated. Emergency push-buttons are provided for to bring the system to order again A failure may occur by mischievous persons tampering with the magnetic track devices, or by putting trolleys on and off the rail.

APPLICATION OF AXLE COUNTERS

As already stressed, Axle Counters may be used instead of track circuits on tracks with iron sleepers. Three major forms of application are existing :—

(a) Track sections within station yards for traffic in any direction.

(b) Dead-end tracks as e. g. at terminal stations or sidings with buffer stop.

(c) Line sections between stations.

The following explanations may be given regarding these major application forms.

(a) The apparatus is direction sensitive, which means the train may move in any direction over the counting spot and the number of axles is counted " in " or " out " according to the direction of the movement. Track sections from 15 upto 2600 feet of length can be controlled with this type, the limitation arising out of the cable resistance over which the electric impulses of the track devices have to be transmitted.

(b) This represents in principle the same arrangement as referred to under (a) , only with slight simplifications. It is of advantage for terminal stations with steel sleepers or where extremely low ballast resistance prevents the adoption of track circuits. The length of the section, however, is not restricted and may be indefinite.

(c) A counting apparatus, which indicates " line clear " when the line is not occupied, is installed at each station. The two stations have to be connected only by to open line wires. Since the apparatus of this type cannot be made direction sensitive as the countermechanisms are not coupled mechanically by a differential gear, shunting movements over the track devices will not be registered properly. The track devices have, therefore, to be installed beyond the advance starter or shunt limit board. Train runs are, however, properly registered in both directions.

This type of installation is suitable for an Axle Counter Block System by which no tokens are required, as the axle counters prove the occupation of the line.

CONCLUSION

Axle Counters as used with Continental Railways constitute a new principle of modern signalling to be adopted at sections with iron sleepers in lieu of track circuits. They should also be suitable for Indian conditions where iron sleepers are provided most commonly, and the expenses for wooden sleepers may be saved when applying methods of modern signalling which necessitate an absolute control of the occupation of the track.

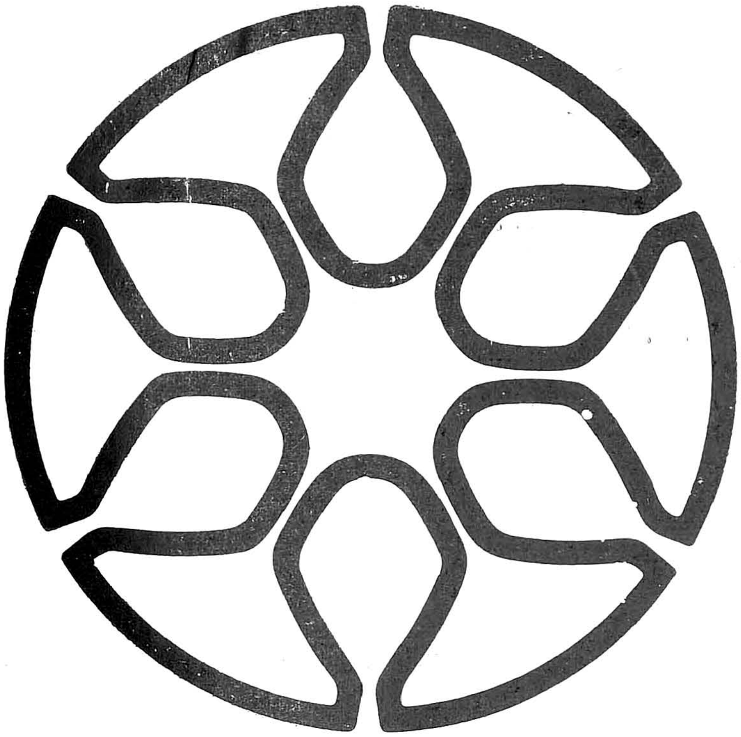
ELECTRIC PASSENGER COACHES TO BE MANUFACTURED IN INDIA

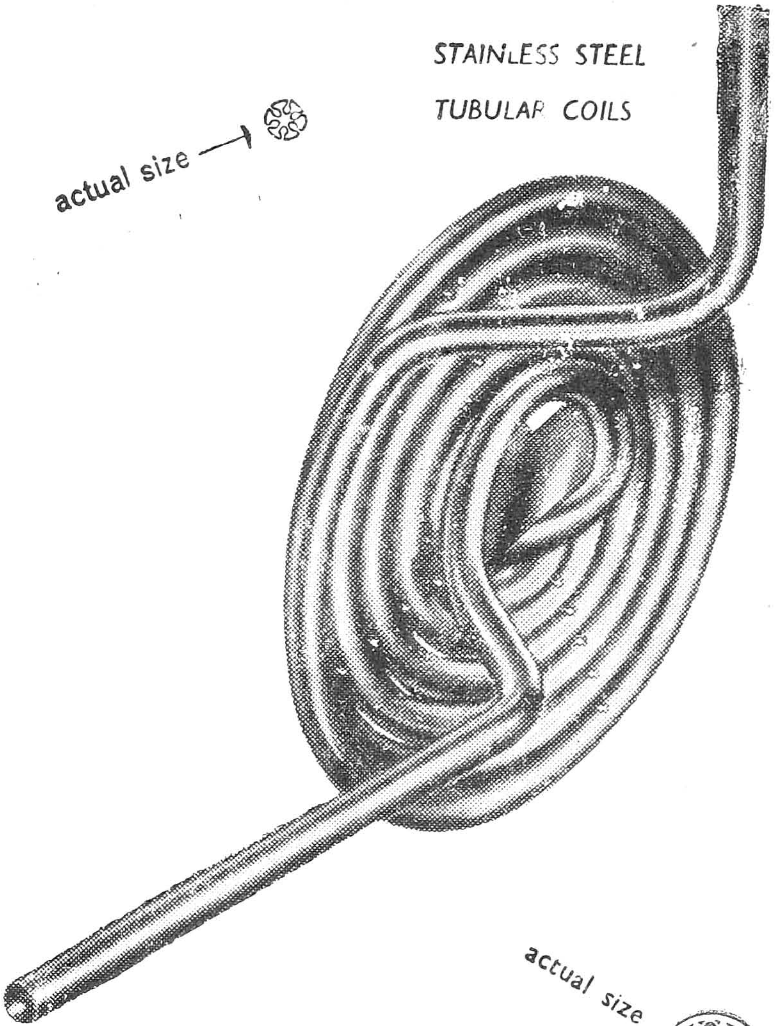
For the first time in India, electric passenger coaches for the Railways are to be part-manufactured within the country, it is learnt.

An order has been placed with a Calcutta firm of rolling stock manufacturers for the supply of over 100 such coaches.

These will be used for the Calcutta Electric Suburban Services.

The Railway Board is believed to have stipulated that the Calcutta firm will begin delivery of the electric coaches towards the end of 1957.





A heat exchanger tube was wanted in stainless steel. The outside diameter had to be 3/16" max., but the surface area had to equal that of a tube 9/16" o/d. The above illustration shows the practical answer that TI provided to this problem.

THE TUBE INVESTMENTS GROUP of THE U. K. is the largest manufacturer in the world of precision and special purpose tubes.

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Hauling Heavy Machinery up Mountains

ROAD TRAIN FOR AUSTRALIAN HYDRO-ELECTRIC SCHEME

BUILT to the order of the Snowy Mountains Hydro-Electric Authority to transport heavy machinery weighing up to 120 tons over mountain tracks and gravel roads in country rising to 7,300 ft. with gradients of up to one in seven, one of the largest and heaviest road trains ever to be constructed in the United Kingdom was recently put through its paces in a successful road test from Birmingham to Newport.

The test route followed was by way of Worcester, Gloucester, Ross-on-Wye and Mormouth to the Uskmouth Generating Station at Newport and was sufficiently varied in character to provide opportunities for negotiating city traffic, narrow bridges and several hills with steep gradients during the latter part of the journey. The total gross running weight of the train during the test was 223 tons, exclusive of the weight of the crew and observers and loose equipment.

The train consists of two Thornycroft "Mighty Antar" tractors and a Crane independent multi-wheeled trailer, the combined overall length of tractors and trailer being over 131 feet.

The assembly of the tractors will be carried out in Sydney by Thornycrofts who will deliver the complete road train to the Authority's transport base at the rail head at Cooma, 250 miles away.

MOST INTRICATE SCHEME

The Snowy Mountains Hydro-Electric Authority came into being in 1949 by a special Act of Parliament passed by the Australian Government. Investigation and preparatory work has been proceeding ever since on what has been referred to as the world's largest and most intricate development scheme.

The purpose of the scheme is to extend the supply of both water and power so that Australia can expand industrially and substantially increase the country's food production. The scheme involves the construction of eight major dams, 16 power stations, 86 miles of tunnels, 490 miles of racelines to pick up streams and lead their waters to reservoirs, and some hundreds of miles of loads and tracks in precipitious country rising to 7,300 feet.

Ultimately the scheme will have a generating capacity of approximately 3,000,000 kw. of power and will make available for irrigation in the Murray and Murrumbridge Valleys over 2,000,000 acre feet of water each year, sufficient to produce additional foodstuffs to the value of £ 25,000,000 annually.

"MIGHTY ANTAR"

The construction of the power stations will involve the transport of several units of indivisible machinery weighing well over 100 tons and it is for this duty especially that the present road train has been built. The Thornycroft "Mighty Antar" tractor is powered by a Meteorite 250 b.h.p. 8-cylinder oil engine and includes in its specification power-assisted clutch operation, steering and braking with the drive transmitted through Thornycroft designed main and auxiliary gear boxes to two double reduction rear axles having a ratio of 16.6 : 1. These axles are equipped with twin 14.00-24 20-ply tyres. Each tractor carries a spare wheel and tyre which is mounted on the back of the ballast container, this wheel being raised and lowered by means of a hand operated derrick. Trailer brake connections are provided at the front of each tractor for double heading and pushing purposes. The two tractors may also be used for side pushing the trailer so that air pressure brake connections are fitted in a convenient position for this duty. The air pressure brake connection at the front of the tractor can also be used for charging and operating the brake of a disabled vehicle.

Each tractor has an all-metal cab, equipped with an electric fan, Clayton-Dewandre heater and windscreen defroster for safe driving in the varying climatic conditions which occur at different altitudes during the year. A Darlington "type 70" power driven winch with a pull of 50,000 lbs., together with 350 feet of 1" diameter steel cable carried over fairleads front and back of the vehicle, will be used to draw the trailer through fords or to extricate the prime mover should it become bogged.

The winch fairleads allow the winch rope to operate rearwards at various angles on either side of the centre line.

Both the front and rear drawbar gear are of the unsprung type.

Communication between the crews of the tractors and transporter is provided for by means of inter-communication equipment with the addition of a hand microphone for each of the drivers for use under conditions when messages sent over the communication system might not be easily heard.

THE PRINTER'S DEVIL

By Hector Rodrick ★

THE Devil is the article, cannot scare you dear Reader! Nevertheless, the demon is one, we printers dread; the term Printer's Devil has its origin in the sixteenth century. In those early days of printing, the art was much of a mystery, and ignorant people thought that the printer evoked the aid of the powers of evil. Aldus Manutius, the famous Italian printer of the sixteenth century, went to Africa on an exploring expedition and brought back with him a very black negro boy. Negroes were a rarity in Italy then. The report immediately gained circulation that the printer had been employing the black art in his work, and that the pickaninny was in reality an imp of Satan. He was called " the little devil. " The charge became so serious that the printer was forced to exhibit the negro in public. In his announcement he said: " Be it known to Venice that I, Aldus Manutius, Printer of the Holy Church and to the Doge, have this day made public exposure of the printer's devil. All those who think he is'not flesh and blood may come and pinch him. " Since then the term Printer's Devil was held to connote a lad employed in a Press for errands and other jobs. Nowadays, however, the term is meant to signify the ubiquitous Printer's error.

What is a Printer's error? Like every other expression, it can have a variety of meanings, depending on the necessities or desires of the individual using it. It might mean an ordinary mistake in composing, which is immediately noticed by the Press Proof Reader and duly put right by the compositor in the ordinary work of correction. Such errors are one of the necessaries of life for if a compositor were told that he would be expected to produce work which never had a mistake at all, he would have to slow down his work to such an extent as would more than set off the time taken in making corrections, and further he would probably be reduced to a state of nervousness that would eventually prevent him working at all. On the other hand, the expression might, and largely does, mean one of those rare mistakes which the proof reader either fails to notice or has not had the opportunity of noticing owing to undue pressure and which appears in all its naked horror in the printed job. Some idea of the varied extent of mischief the Printer's Devil can cause is reflected by some of the following quotes which the helpless and powerless printer could not suppress despite the finest proof reading, the smartest batch of compositors, the most painstaking body of sub-editors and supervisory staff.

PRINTER'S ERRORS—GRAVE & GAY

From the Oklahoma City Times: "Warren R. Austin, Chief U. S. delegate to the United Nations. . . . ."

From the Daily Despatch: "The Russian General deceived the Press in a room decorated with photos of the wrecked plane."

In the Country News: "The trip on the Bombay-London route was made in a Consternation plane."

Headlines in an Athens Paper: KING OF GREECE DIES UNEXPECTEDLY; PRINCE PAUL WILL GET THROWN.

In the Medical Digest: "The doctor felt the patient's purse and admitted that there was nothing he could do."

A retired Printer went into the restaurant business." This is an outrage—there's a needle in the soup" cried one of his customers.

"Merely a typographical error, Sir, said the aforetime printer suavely," "should have been noodle."

Whilst these little quotes do provide fun and amusement to the general public, do pity the poor printer or publisher!

---

* *Asst. Press Supdt., Central Railway Press, Byculla, Bombay-27.*

"FACE-LIFTING" TREATMENT FOR FIRST CLASS COMPARTMENTS

First Class compartments throughout the country will within the next few months undergo a "face-lifting" treatment, to keep passenger amenities upto required schedule. The Railway authorities have been requested to ensure the separate reading lights are provided. The longitudinal (lengthwise) berths will have pull-out seats, while the transverse (across the compartments) berths will have bed-cum-back rests. All the old commodes will either be thoroughly repaired or changed. Instructions have also gone out that water taps, flushing arrangements, wash basins, lights, fans, doors, latches, bolts, etc., should be checked up immediately. As a large number of compartments will have to undergo this "face-lifting" treatment, the process is likely to continue over six or more months.

Perambur Rail Coach Factory—Asia's Biggest Unit

ON Mahatma Gandhi's next birthday, October 2, 1955, Sri Jawaharlal Nehru will press a button at Perambur, in the north-west suburbs of Madras, and within a matter of seconds India's first all-steel, light-weight integral rail coach will roll ostentatiously out of the State-owned, Rs. 7.3-crore Integral Coach Factory's assembly lines.

The Prime Minister will then go round portions of the 52-acre grounds on which stands this modern Factory with its workers' residential colony, and inspect a few of the ten giant shops out of which will emerge a complete new coach every six working hours when target production is reached in 1959-60.

The Perambur Factory will be the largest of its kind in Asia and one of the largest in the world.

PRODUCTION PROGRAMME

In the first year of its working the Factory will turn out 20 coaches with components imported from Switzerland. Thereafter, an increasingly large proportion of Indian-made components will be used.

Production will increase five-fold in the second year, reaching 200 coaches in the third and 300 in the fourth years. During 1959-60, the fifth year of production, the target of 350 coaches will be reached, with parts and components completely manufactured at the Factory itself.

For the present the Perambur Factory will turn out only third class coaches. It will produce the empty shells, leaving inside furnishings to other railway workshops.

FEATURES OF INTEGRAL COACH

The Factory has taken its name from the "integral" coaches which it will manufacture. Unlike the conventional type in which the coach-body is merely mounted and fixed to a separate steel under-frame, the integral coach as its name suggests will have its body and under-frame integrated into a single unit, all made of steel, with several advantages over the present type.

It will have smoother riding qualities and will, therefore, be much less jerky while on the run.

It is light-weight, being seven tons lighter than the conventional 42-ton coach. Therefore, more coaches can be hauled per locomotive.

In the event of an accident it will afford greater protection to passengers, since it is built for strength, with an anti-telescopic device, and its body will not get smashed up as easily as in the old type coach in which the body, being a separate piece, gets pushed off and broken up in an accident.

Thanks to a special type of insulation used, heat and noise inside the integral coach during travel will be eliminated to a marked degree.

In travelling comfort the integral coach will equal the best of its kind in Europe. In India it will set a new standard.

735 MACHINES HELP TO MAKE A COACH

It will take the noisy co-operation of 735 individual machines to yield the target production of a coach every six working hours, in a single shift. The machines will be housed in ten giant shops, the largest among them, 1000 feet by 260 feet, being perhaps one of the largest of its kind in the Indian Union.

Through the ten shops run 12 miles of railway. As a result of special devices which have been adopted, the 8.4 million square feet of covered space in the shops will be unusually clean and dust-free. They are well-ventilated and lighted with flourescent tubes. A public address system will link the shops, enabling instant contact between management and the general body of workers. Canteens, tiffin sheds, washing and shower baths are among the other amenities which have been provided.

Production in the shops will be based on the modern uniflow system. The various stages of actual production are organised in different shops situated end to end in a straight line, the raw material being fed at one end of the straight line and the finished coach coming out at the other, in a cycle. This method of production ensures greater economy and smoothness in working.

INDO-SWISS CO-OPERATION

Eight European countries are supplying the machinery needed for I. C. F. Sixty per cent of this has been indented from Germany, 15 per cent each from Switzerland and the United Kingdom, and the balance from Czechoslovakia, France, Italy, Belgium and Sweden.

The Factory itself is a product of Indo-Swiss co-operation in the technical field. As a result of an agreement between the Government of India and the Swiss Car & Elevator Manufacturing Corporation Ltd., of Schlieren, Switzerland, the latter is providing the technical "know-how" including specialised personnel as well as the necessary facilities for training Indian staff in coach manufacture at its works in Switzerland. Forty Indians have completed their training, and another 19 are now in Switzerland.

from strength to strength

in steel

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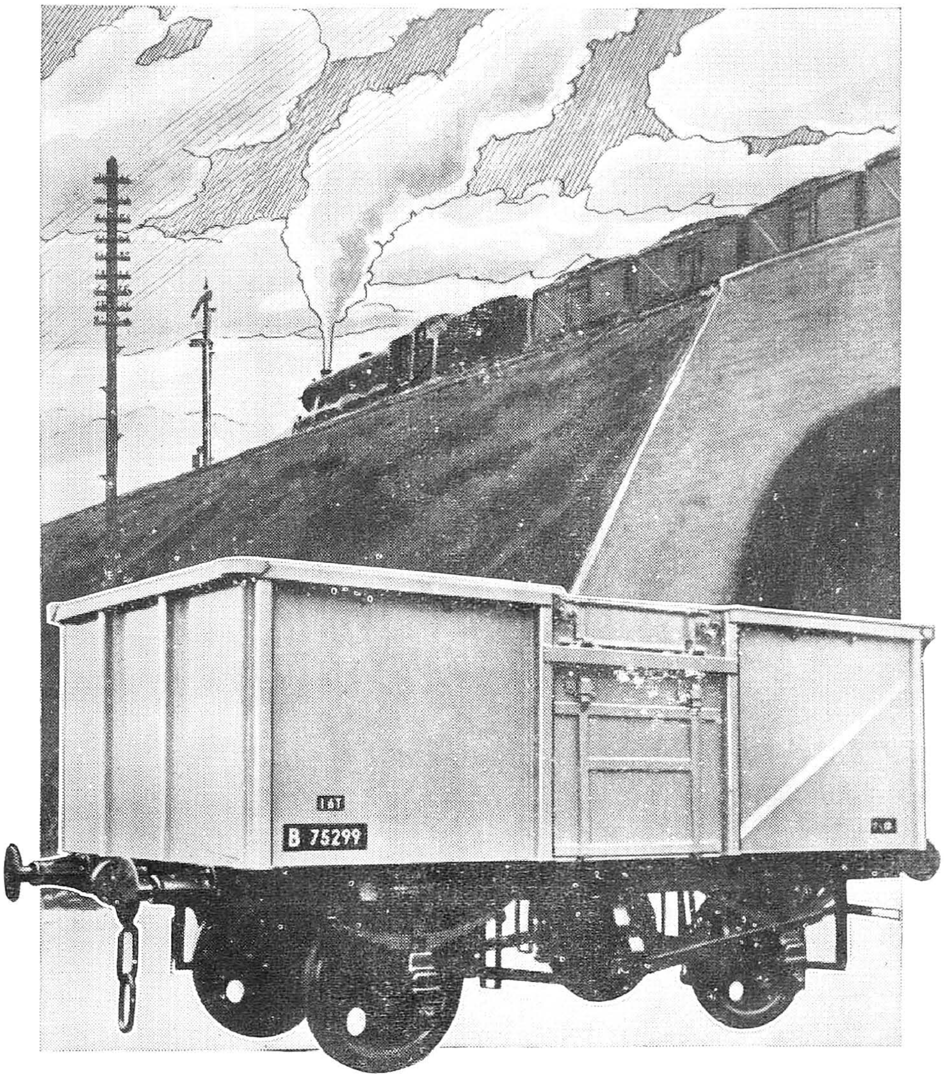
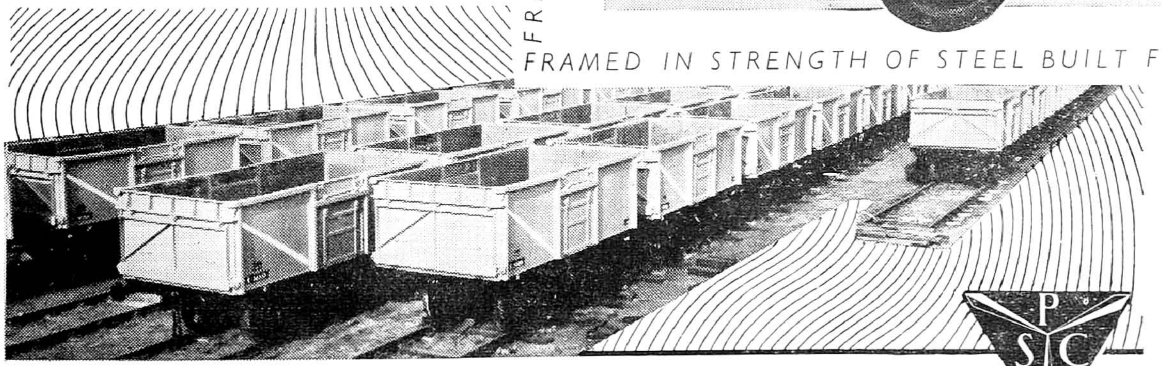
For enduring service . . . the strength of steel. For design and construction, sound, steadfast and reliable . . . the immense facilities, the engineering experience, the craftsmanship of Pressed Steel Company Limited. Strength added to strength . . . reason enough why over 11,000 of these 16-ton mineral wagons will be Pressed Steel built to the order of British Railways annually. *Pressed Steel Company Limited also manufacture wagons and rolling stock for world railways.*



FRAMED IN STRENGTH OF STEEL BUILT FOR ENDURING SERVICE



RAILWAY DIVISION, PAISLEY, SCOTLAND

HEAD OFFICE COWLEY, OXFORD

wagons and rolling stock by **PRESSED STEEL COMPANY LIMITED**

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The designing and execution of the civil engineering works on this project and its residential colony have been completely in Indian hands.

Approximately 4,000 workers will man the Factory when it is in full production, 75 per cent of them being skilled workers. For the training of these men a Technical Training School was founded at the Factory site on March 20, 1954, to turn out 500 men per year initially. The School employs modern methods of training and has its own satellite workshops.

READY IN THREE YEARS

On June 1, 1951, I. C. F. was officially born. Its first headquarters were located in railway retiring rooms at Egmore staion, Madras.

It was in September 1952 that the first pile to support the Factory's huge structures was driven. From then on it has been rapid going.

In the end of October 1954 the first consignment of machinery was landed at Madras harbour. Within a year from that historic event the first coach will be turned out—the beginning of a new era in the manufacture of rail coaches in India.

The Perambur factory will take the Indian railways a long way on the road to self-sufficiency in passenger coaches and also help them to fight overcrowding.

Not only that. When the Factory reaches peak production, it will help the country to save a considerable amount of foreign exchange each year. Equally important is the fact that it will provide a great fillip to many ancillary industries. Examples: rubber, aluminium, chemicals.

BEHIND THE FACTORY

How much does it take in physical resources to "get up" a modern coach factory—beginning from the civilisation of what once was desolate waste land to the production of a modern, streamlined coach?

Into Asia's largest coach factory have gone over 8,000 tons of steel, 20,000 tons of cement, 12 miles of railway sidings, 15 miles of water supply pipes, 5.5 miles of roads and a great many other things.

Adjoining the Factory is the workers' residential colony, a miniature township with 400 houses, parks, playgrounds, a fine club house and other modern amenities. Provision has been made for the supply of 6,000,000 units of electricity per annum to the township and the workshops.

YOUR MAGAZINE

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TANJORE (S. I.)

Automatic Lubrication of Mechanical Signals

By A. Muir

The problems associated with the lubrication of railway signalling equipment are of a complex nature and merit close study in their solution.

IT will be appreciated that the number of bearing points in wire wheels and point rod cranks between a signalbox and the ultimate bearing point on semaphore signals is numerous, and unless these bearings are properly lubricated much wear and tear of pins and bushes can take place. However, it must be clearly understood that systematic inspections of signalling equipment must be ensured, and that this is the duty of the maintenance man.

The illustration shown on the opposite page is of bridge signals situated on the main line at Bridge Street, Glasgow, and it is interesting to note that 55 lubrication points are automatically lubricated from a central point by means of a mechanical oil pump, actuated by a lever linked to the balance lever on one of the signals.

A main pipe line is run from the pump along the side of the gangway. From this main pipe line, distribution pipes are run up the various signal lattice frames being then branched to each of the signal bearings which are fitted with meter valves to allow of a calibrated quantity of oil only to be passed in a given time.

Every time the signalman pulls the lever of the particular signal on which the pump is mounted, a definite quantity of oil is discharged into the system (in this case, approximately 200 operations per 24 hours).

The advantages of this system are at once apparent when it is noted that less than 2 pints of oil is required over a period of two weeks and that also the entire system is insulated against the ingress of foreign and abrasive substances. All bearings therefore automatically receive a regular quantity of oil, and the danger of overlooking any of them is eliminated. The time factor is also another important feature as, apart from filling the oil reservoir at a scheduled time and routine inspection, no further attention is required.

Attention has also been given to the effective lubrication of all intermediate point and crank bearings from the signalbox to the bridge signal, and these are fitted with Hydraulic grease nipples.

To enable large numbers of nipples to be serviced in a comparatively short time, and avoid undue loss of time due to continual re-filling of grease guns, the Knapsack Compressor (which has a lubricant capacity of 11 lb.) has been adopted for this purpose.

Thus is further proof given of the ability of Tecalemit equipment to provide for every type of lubrication requirement.

IMPROVEMENTS IN THIRD CLASS COACHES

Toilets in all third class coaches used on long-distance journeys are now to be provided with wash basins for the convenience of Passengers. All third class coaches used as sleeper cars will be fitted with wash basins and "anti-waste" water cocks with effective drainage arrangements. Three different types of wash basins have been designed by the Central Standards Organisation for different types of compartments. The windows of all third class sleeper coaches are to be fitted with bars to provide greater security.

STEEL PLANT FOR INDIA

A steel plant will be built in the state of Madhya Pradesh, India, with the aid of the Soviet Union. Designs are now being prepared in the USSR for this construction. Gipromez, the State Institute for the design of metallurgical plants, is responsible for the main projects. Here is what our correspondent has learned from Boris Voyevodin, Assistant Chief Engineer for the project of the Indian steel plant.

"Our Institute", said B. Voyevodin, "is designing the main technological departments (open hearth blast furnace and rolling departments), as well as the repairs and auxiliary departments, the water supply and drainage systems, fuel, power and transport, general buildings and services (the latter include schools for training workers for the plant)".

He added that a few more organizations are co-operating in this work.

Asked whether there many Moscow organizations among them, he said: "The majority, a substantial volume of the work has been assigned to the Moscow branch of 'Teploelektroproyekt' and to the 'Tiazhpromelektroproyekt' Institute. The first prepares designs for the electric power plant and steam and air blowing station, while the second is designing the power supply system, electrical equipment and electric lighting of the plant. Specialists of the 'Stalproyekt' Institute are designing the open hearth furnaces, the pits and furnaces of the rolling mill, while the central design office of 'Energochermet' (Ministry of the Iron and Steel Industry of the USSR) is preparing drawings for the control instruments, and automatic equipment The designs for the cooling equipment have been entrusted to the Central Bureau for the Design of Refrigerating Machinery.

"But that is not all. Designs for the steel plant in India are being prepared by 'Giprokislorod', 'Giprokhim' and the Institute for Designing Gas Clearing Equipment. The first of these is designing technological oxygen stations for open hearth furnaces, the second—a sulphuric acid shop, and the third—equipment for clearing blast furnace gases. Designs for the communication services and production signalling systems are being prepared by Design and Assembly Trust No. 5 of the Ministry of the Radio Engineering Industry of the USSR".

Asked how all this will be adapted to the climatic conditions in India, B. Voyevodin said:

"An abundance of atmospheric precipitation and a great number of sunny days are characteristic of the climate in India. In the area of the construction the absolute highest temperature reaches 47.2°C, while the lowest is plus 4 degrees. Certainly, these specific features must be taken into account. The designers of the communication and signalling systems, for example, have been carefully selecting cable and other items. Ventilation is most important in the given climatic conditions. Provision has been made for air conditioning".

Asked what organizations outside of Moscow are co-operating in the preparations for building the plant in India, he said:

"An important order is being filled by the 'Giprokoks' Institute of Kharkov, which designs the coke and chemical shop. The Leningrad Institute for Mechanized Ore Benefication is preparing the designs for a benefication factory which will handle small iron, ore, and the Leningrad Fireclay Institute is designing the fireproof materials shop".

B. Voyevodin named the Soviet factories which will produce equipment for the Indian plant. Orders for rolling mills, blast furnaces and other equipment will be filled by the Ural Machinery Plant, by the old and new Kramatorsk plants. The "Podyomkik" Plant of Moscow and the Kirov Plant of Leningrad will supply electric bridge cranes and other hoisting and transport equipment. Air blowing machines and other equipment will be produced by the Lenin (Neva) Machinery Plant of Leningrad, etc.

A group of Soviet engineers is at present studying in India the conditions in which the construction will be conducted. Indian specialists are conducting geological surveys and studying in the laboratories the raw material resources of the plant (iron ore, coking coal, limestone, etc.). It is planned to build a well appointed city for the workers of the plant. Preparations have already been started for the construction of homes, auxiliary factories for the construction of the plant, a railway and water supply system.

Encouraging Progress by Automobile Industry

HUNDRED PERCENT INDIAN CAR AT NO DISTANT DATE

AT no distant date a completely Indian car will come off the assembly line. Already encouraging progress has been made by the Indian automobile industry, which is of recent growth, in the drive towards attaining self-sufficiency. A popular car has now attained 65 per cent, in terms of value, in respect of indigenous production of parts. In the manufacture of trucks, the level attained is about 50 per cent.

Considering that the re-orientation of the industry in the direction of complete manufacture of cars and trucks in India, rather than mere assembling of imported parts, was started in earnest only two years ago, this progress cannot be considered insignificant.

The importance of the development of a sound automobile industry, to serve the needs of trade and industry as well as the common man, cannot be overemphasised. It was in March 1952 that the Government of India referred to the Tariff Commission the question of protection and assistance for the encouragement of the automobile industry.

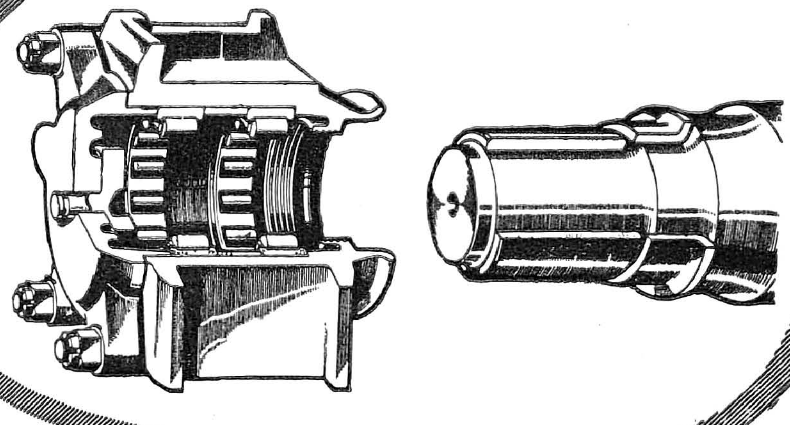
The year 1954 was an important landmark in the development of this major industry in India. The Government gave effect to the recommendations of the Tariff Commission which gave definite indications of the lines on which the industry was to be developed. The types and makes of vehicles to be manufactured in India were decided upon and import licenses were restricted to those firms which submitted satisfactory programmes for the manufacture of those vehicles. Assemblers who had no manufacturing programme were asked to close down, but were given sufficient licenses to enable them to close down smoothly.

PROGRMME OF MANUFACTURE

Under the manufacturing programme now being implemented, four types of cars, namely, baby, light,

NBC

AXLE BOXES FOR SMOOTH RAILWAY TRACTION



This simple compact design of the NBC Axle Box employs two NBC parallel roller bearings, and the one piece inner race is mounted direct on to the axle.

Screwed axle ends and other clamping devices are eliminated—the box & bearings are simply slid on to the inner race.

The NBC roller bearings with their true line contact and rolling action have a very high load capacity and their durability gives the box extremely long life.

The housing is easily removed for bearing inspection and adjustment to the bearings is not required when mounting.

Parallel Roller Bearing Axle Boxes

NATIONAL BEARING CO., LTD. JAIPUR, RAJASTHAN.

Calcutta Office : IA, Vansittart Row, *Telephone :* 23-4922

Bombay Office : 26 Calicut Street, Ballard Estate, Fort. *Phone :* 20484

medium and heavy, and four types of commercial vehicles, i. e. trucks, buses, etc., with capacity ranging from one ton to five tons and more, are being produced in the country. In addition, the manufacture of diesel trucks and jeeps has also been licensed.

Under the programme the manufacture of vital sub-assemblies, normally expected to be manufactured by automobile makers, namely, engine, transmission, rear axle assembly, front axle and chassis frame, are being gradually manufactured by the licensed firms.

It may be interesting to note that the automobile industry in India is following the pattern of the industry's development in industrially advanced countries. According to this pattern, automobile manufacturers manufacture most of the major components, while the minor components and accessories are produced by an ancillary industry independent of but acting in close co-operation with the manufacturers of complete automobiles. In addition, raw materials and products like textiles, glass, paints, etc., are drawn from the producers in other industries.

In India, some of the manufacturers have begun producing complete engines with the exception of electrical accessories fuel pumps, carburettors, gaskets, and bearings. The major part of the components of the engines in one type of car and truck are also being produced. Complete gear boxes are being made for a type of car and a group of trucks. Propeller shafts and universal joints for a group of commercial vehicles are now produced. For one type of popular car, the rear axle, including differential, is in regular production, while for a group of commercial vehicles the production of axle will begin towards the end of this year. A complete chassis frame is being produced for a group of commercial vehicles, while all vehicles except one, use indigenous loaf springs.

SPARE PARTS

Ancillary industries producing spare parts and accessories have also made considerable progress in India. There are 18 firms licensed for making automobile ancillaries of which eight have gone into production. The rest are expected to commence production by the end of the First Five Year Plan. Some of the spare parts made by these ancillary industries are pistons, piston rings, cylinder liners, gudgeon pins, gaskets, valves, brake linings, clutch discs, radiators, shock absorbers, leaf springs, tyre inflators, fuel injectors and sparking plugs. In 1954, nearly one lakh pistons, 12.5 lakh piston rings, 84,000 sparking plugs and 3,200 fuel injectors were produced in the country.

All automobile manufacturers use indigenous items like tyres, tubes, all rubber components, batteries, upholstry material, body panels for trucks, cabs, brake fluids and sparking plugs and a large number of other items.

The production of cars and trucks in India in 1954 rose to 14,462 from 13,926 in 1953. The Indian automobile industry has a total paid-up capital of about Rs. 14.35 crores, almost entirely Indian. It provides employment to over 7,000 people, nearly half of whom are skilled and semi-skilled workers.

INCREASE IN DEMAND

One of the problems faced by the industry is the low demand for vehicles of all types in the country. If the demand were to rise, higher production would help to solve the other problems faced by it. Fortunately, of late, the demand has been on the increase. In the first five months of 1955, 7,613 cars and trucks were sold in India which is more than half the total number sold for the whole of 1954.

The progress of the industry is being closely watched by Government whose endeavour it is to ensure the speedy development of the industry as well as a fair deal to the consumer. With this end in view, Government have taken steps to ensure that prices are kept at reasonable levels. They have recently fixed a maximum mark-up for the retail prices of spare parts and taken steps to secure better servicing facilities for car owners and for investigation of complaints regarding inadequate servicing and vehicle defects.

MOTOR-CYCLE AND SCOOTERS

Production of motor-cycles has also started. A firms in Madras has been licensed to manufacture motor-cycles in progressive stages in collaboration with a British firm. A scheme has also been approved for the manufacture of motorscooters by an Indian firm in collaboration with an Italian company.

CONTROL OF MALARIA IN URBAN AREAS

By F. W. Knipe, Malaria Institute of India

THE most important factor, for malarial control, within any area, urban or rural, is the density of Anopheles development within flight range of the area. Anopheles is the mosquito which spreads the material germs.

Three techniques are employed for the elimination of the Anopheles mosquito. In the residual spraying technique, poisons are applied to natural adult mosquito resting places. Larvicides are used to kill larvae breeding on fresh water surfaces which cannot be eliminated. Lastly, there is the technique of reducing or eliminating unnecessary fresh water surfaces where the larvae develop into adult mosquitoes. The application of any of these methods will depend on its effectiveness within a rational cost limit.

Residual spraying of walls of houses, cattle sheds and other animal quarters is inexpensive and has been adopted for rural areas as the cost per house works out only to a few annas. The spraying is done only two or three times a year to a premise. But as the density of premises per unit area increases, the cost also steadily rises from rural to semi-rural and finally to urban areas, with total cost increasing in direct proportion to the number of houses treated. This increase may suggest the application of larvicide as an alternative, but this has to be done weekly to water surfaces scattered over a wide area. Therefore, larviciding has little to recommend it under modern malaria control methods, excepting in unusual circumstances.

The third method is reduction or elimination of unnecessary fresh water. It is at the surface of this fresh water that mosquito breeding occurs. Since any surface area is capable of supporting only a certain number of larvae which can develop.

In urban areas may be found two rather distinct types of fresh water. One type may embrace outdoor ponds, or lakes or streams; in fact any normal body of fresh water. But there exists another often overlooked type of fresh water. It is water stored for various household and ornamental purposes. Such storage places include roof tanks or reservoirs, storage pots, flower vases, fish bowls or any other receptacle containing water which may foster larvae development.

Furthermore, there may be refuse dumps, where broken pots or pans, or any vessel which could hold fresh water, are discarded. Such vessels may be dangerous sources of mosquitoes, particularly during the monsoon season.

Both of these potential breeding places must be sought out and eliminated. Storage tanks should be closed with mosquito proof covers. Vessels within or around the house which contain standing water should be emptied frequently—at least once in every seven days. These are small individual potential sources of mosquitoes for which the house-holder should hold himself accountable. Thus he could contribute to control of malaria as an individual.

Furthermore, when old pots or pans of old tins which might hold water are discarded, the householder should make sure these vessels are broken or punched full of holes so that water cannot be retained within them. This is another place where individuals may assist in malaria control.

Wherever malaria is a problem in an urban area, regardless of its size or location, the reduction of breeding surfaces for mosquitoes assumes paramount importance. It costs less to eliminate breeding permanently than to continue to larvicide an area, or to residually treat all premises in that area for an indefinite period of time.

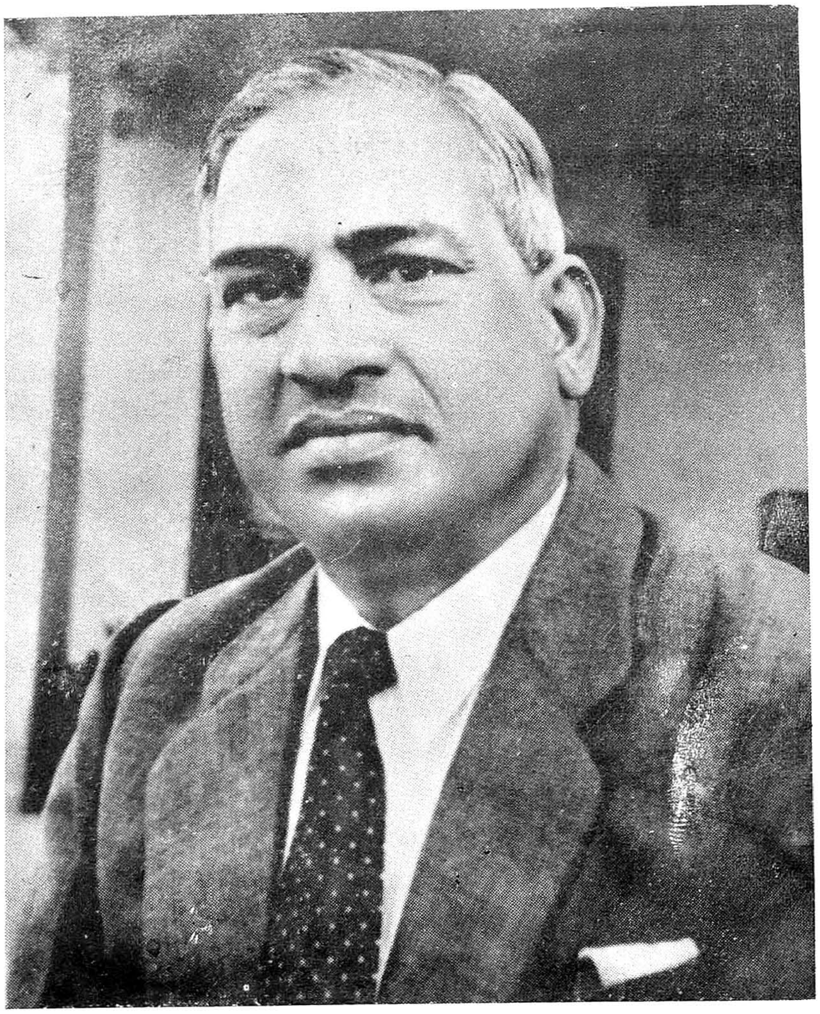
PRIZE WINNERS

COMMENCING with the year 1954, the Railway Board have instituted two annual awards for the best and second best articles respectively published during a calendar year in the Indian Railway Technical Bulletin. A committee of judges comprising the Director Research, Director Mechanical Engineering and Director Civil Engineering have announced the following awards for the year 1954:

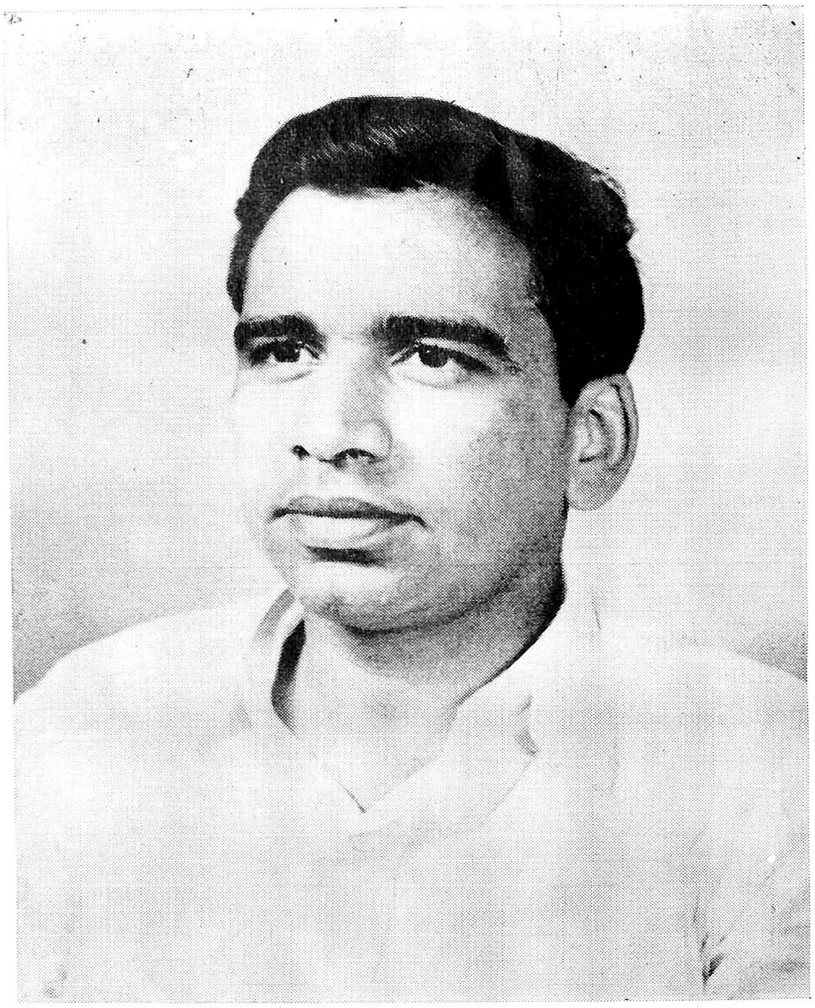
First Prize Rs. 200/- was awarded to Shri Gurdial Singh A. M. I. E., A. M. I. Struct. E.Executive Engineer (Survey), Northern Railway for his article entitled " Culverts in High Fills " which appeared in the Indian Railway Technical Bulletin No. 115, November 1954 issue.

Born in 1905, after passing the Matriculation examination in the 1st division he joined Civil Engineering School, Lucknow. He was elected to Associate Membership of the Institute of Structural Engineers, London, in 1932 and has been an associate member of Institute of Engineers (India) since 1949.

Appointed in the Design Office of the former North Western Railway he was during the course of his early service responsible for the design of many important buildings, bridges and steel structures; on the ex. E. P. Railway he was employed on the survey in connection with provision of rail facilities for the new capital of the Punjab and on the Mukerian-Pathankot Railway construction. He has contributed several articles to the Quarterly Technical Bulletin and the Proceedings of Punjab Engineering Congress.



Shri Gurdial Singh.



Shri S. C. Vadera.

Second Prize Rs. 100/- was awarded to Shri S. C. Vadera, Production Engineer, Central Railway, Locomotive Workshops, Parel for his article entitled 'An Appromixate Analysis of Static Stresses and Deflections in an I. R. S. Carriage Underframe, modified for Air-conditioned Coach' which appeared in the Indian Railway Technical Bulletin No. 114, August 1954 issue.

Born on 17th March 1927, he passed Senior Cambridge in 1942 and Inter Science in 1944 both in the 1st division. In 1945 he joined the railways as a special class Apprentice at Jamalpur and stood first in the final year in his batch. He was posted as Assistant Mechanical Engineer on the ex. G. I. P. Railway in 1950, and also worked as an Assistant Works Manager in the Matunga Workshops. He was awarded a Scholarship under the Industrial Co-operation Scheme and received 15 months training in Locomotive Engineering in West Germany recently. For sometime he was posted as Personal Assistant to Chief Mechanical Engineer, Central Railway. His hobbies are photography and carpentry.

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SOUTHERN RAILWAYS MAGAZINE Regd. No. M. 5551 Vol. VII. No. 2 August 1955

CLEANLINESS LEADS TO HEALTH AND HAPPINESS

Clean orderly habits contribute to general health and welfare and as such to happiness and prosperity; they are more important than medicines.

Cleanliness prevents disease; medicine only attempts to cure.

Cleanliness of the person, of the houses and colonies, reflects discipline in the individual and the community. Discipline is the foundation stone for progress of oneself and the country. Cleanliness is a good habit. It is also cheap.

All Railwaymen should set an example of cleanliness. This will help others and themselves.

Printed and Published by Sri T. S. S. Rao, Public Relations Officer at S. R. Press for the
" Southern Railways Magazine ", Manojiappa Street, Fort, Tanjore.
Managing Editor : T. S. Krishna Rao.